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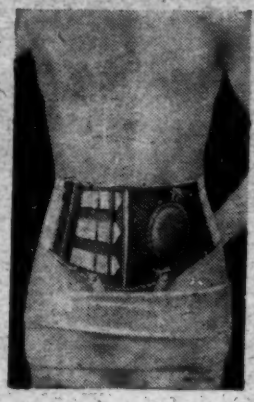

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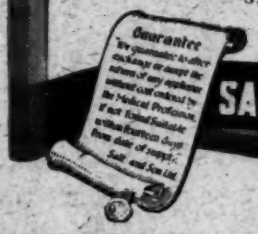

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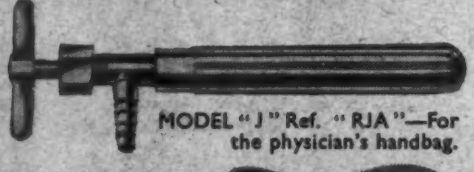

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 16 1950

CONGENITAL HEART DISEASE*

A REVIEW OF ITS CLINICAL ASPECTS IN THE LIGHT OF EXPERIENCE GAINED BY MEANS OF MODERN TECHNIQUES

BY

PAUL WOOD, O.B.E., M.D., F.R.C.P.

Director of the Institute of Cardiology (National Heart Hospital); Physician in Charge of the Cardiac Department, Brompton Hospital

[WITH SPECIAL PLATE]

PART I

In the past the chief contributions to the better understanding of congenital heart disease have been based on necropsy studies, particularly those by Peacock (1866), Keith (1909), and Maud Abbott (1928). More recently, Brown (1939) and Helen Taussig (1947) have presented us with important monographs from a more practical angle, but even these have depended on the correlation of clinical and post-mortem findings. In some respects all these works have necessarily been influenced by the selected nature of the material, and have tended to create a number of false impressions. For example, of Abbott's 1,000 cases there were 37 with three-chambered hearts, 81 with partial or complete transposition of the great vessels, 40 with pulmonary atresia, 21 with persistent truncus, and 16 with tricuspid atresia (total 195); against 33 with atrial septal defect (A.S.D.), 55 with uncomplicated ventricular septal defects (V.S.D.), 105 with uncomplicated patent ductus, 9 with simple pulmonary stenosis, and about 71 with Fallot's tetralogy (total 273), giving a ratio of the rare to the common types of 2:3. Again, in 1947 Helen Taussig stated that she had never had an opportunity of studying a single case of pure pulmonary stenosis. The suggestion that V.S.D. accounts for 35–40% of all congenital hearts seen in school-children (Perry, 1931; Muir and Brown, 1934) is also unacceptable.

In recent years, modern techniques have made it possible to prove the precise nature and physiological effects of 90% of all congenital cardiac anomalies during life. In the light of this rapidly acquired knowledge of dynamic processes, many physical signs have acquired a new significance and their proper interpretation has so greatly improved bedside diagnosis that the special investigations responsible for their discovery have already become superfluous in many cases. The time is ripe, therefore, for a review of the whole subject of congenital heart disease from a more functional standpoint, to present a fresh account of these physical signs, to offer a more practical and physiological classification of the common or well-recognized anomalies, and incidentally to give a truer picture of their clinical incidence. By implication, stillborn infants and those dying shortly after birth have been excluded from the study.

*St. Cyres Lecture delivered on June 13 at the Royal Society of Medicine under the auspices of the National Heart Hospital.

Material.—Observations are based on 233 cases of supposed congenital heart disease examined personally by me during the last two and a half years at the National Heart Hospital, Hammersmith and Brompton Hospitals, in private practice, and at the Rheumatic Fever Centre, Taplow. Of these, 152 were catheterized, and in 42 angiocardiograms were taken. Further confirmation of the diagnosis was obtained at operation in 44 cases and at necropsy in 20.

Techniques

1. Cardiac Catheterization

American nylon catheters and saline manometers were used throughout, as described by McMichael and Sharpey-Schafer (1944). Mean pressures are expressed in millimetres of mercury above the sternal angle with the patient horizontal. Blood gas analysis was carried out by trained technicians using Haldane's or van Slyke's apparatus. The catheter was inserted into a median antecubital vein in all cases but one, in which the external jugular had to be used. Failure to enter the superior vena cava was always due to inexperience and could usually be overcome by asking the patient to breathe deeply or by causing an anaesthetized patient to cough or gasp; changing the position of the head, arm, or body was usually a waste of time. Occasionally it was necessary to change the catheter or to use the other arm. The services of an anaesthetist are required for children under 7 or 8 years old. Dr. B. G. Lucas, at the Heart Hospital, has usually given rectal thiopentone with intravenous supplements.

Venospasm is a reflection on the skill of the operator, and never occurs if the skin is properly anaesthetized, if all traces of disinfectant are washed off the catheter before use, and if the catheter is not too large for the vein. It has caused no embarrassment in the last 100 cases.

Air embolism is avoided by keeping the hilt of the catheter below right auricular level when sampling. It has not occurred in this series.

Thrombo-embolism, paradoxical or pulmonary, is avoided by giving 50 mg. of heparin to the patient, by adding a smaller quantity to the saline reservoir, and by taking care to keep blood out of the catheter, especially when entering a high-pressure chamber and after sampling. It has not been encountered in this series.

Rigors are due to pyrogens in a previously used catheter. They do not occur if catheters are thoroughly washed out and subsequently cleaned by running hydrogen peroxide through the lumen until bubbles cease.

Ventricular fibrillation developed in two patients, and proved fatal in one of them (a severe case of atrial septal defect with gross cardiac enlargement and congestive heart failure). Since then all cases have received quinidine (5–10 gr.—0.32–0.65 g.) half an hour beforehand.

Subsequent infection, such as thrombophlebitis, pulmonary or cerebral abscess, septicaemia, and bacterial endocarditis, should not occur with aseptic technique, but all our cases have been given penicillin for 48 hours after the procedure, as a precaution. No such infection has yet arisen.

X-ray overdosage has been avoided by limiting the screening time to 30 minutes at 1 mA, 20 minutes at 2 mA, and 15 minutes at 3 mA. The operator wears a lead apron and does not regularly perform more than two catheterizations a week.

Failures.—Of 152 cases of suspected congenital heart disease an attempt was made to catheterize the pulmonary artery in 129, and was successful in 110 (85%). This figure includes failures due to inability to enter the right ventricle. The latter was entered in 135 out of 146 attempts (92%). There was only one failure to catheterize the right auricle in the 152 cases. Many of the failures occurred in difficult cyanosed cases, including six with tricuspid atresia and at least one with pulmonary atresia. In acyanotic cases, including simple pulmonary stenosis, the right ventricle was catheterized in 98%, and the pulmonary artery in 91%. In Fallot's tetralogy the pulmonary artery was entered in 15 out of 21 cases. The high incidence of successful catheterization is attributed to the development of what we have called "the coil technique." Instead of attempting to pass the catheter direct into the right ventricle, its tip is first rotated outwards against the lateral wall of the right auricle; a half-loop is easily formed in this situation, and when this is rotated medially the upwardly directed tip passes straight towards the pulmonary artery after slipping through the tricuspid valve.

2. Angiocardiography

I am indebted to Dr. Maurice McGregor, of Johannesburg, for personally constructing the angiocardiograph now used at the Brompton Hospital, and for helping to develop the technique. Copies or slightly modified copies of his model are used at the Hammersmith and the Heart Hospitals. Angiocardiograms have been carried out mostly by the cardiological registrars at these hospitals, particularly by Dr. J. B. Lowe at Brompton and at the Heart Hospital, and by Dr. E. Petrie at Hammersmith. Technical details have been described elsewhere. There were no fatalities.

Incidence

The series was closed at the 233rd case, for by then the nature of the congenital anomaly was virtually certain in 200. Of the residue, 13 proved to have normal hearts, 4 had rheumatic aortic and/or mitral valve disease, 6 had idiopathic pulmonary hypertension, and 10 eluded analysis.

The incidence of the various forms of congenital heart disease encountered is given in Table I. It is believed that weighting in favour of those lesions amenable to surgical repair is slight, because the clinics at which most of the cases were seen did not have a surgical flavour or unduly close surgical link. It is concluded that the commonest forms of congenital heart disease are Fallot's tetralogy (18%) and atrial septal defect (17%); followed closely by patent ductus (14.5%), ventricular septal defect (12%), and simple pulmonary stenosis (11.5%); whilst coarctation of the aorta comes next (8%). Together these six conditions accounted for 81% of the total.

TABLE I.—*Incidence of Chief Anomalies*

Total No. of cases investigated		233
Rheumatic A.S.; M.I.; or A.I.+M.S.		4
Proved normal		13
Primary pulmonary hypertension		6
Nature still obscure		10
True congenital heart disease		200
Acyanotic	No.	%
Coarctation of the aorta	16	8
Aortic or subaortic stenosis	6	3
Simple pulmonary stenosis (4 with V.S.D.)	23	11·5
Atrial septal defect	35	17·5
Ventricular septal defect (excluding 4 with pulmonary stenosis)	24	12
Patent ductus arteriosus	29	14·5
Cyanotic		
Fallot's tetralogy (including 3 with pulmonary atresia)	36	18
Pulmonary stenosis with reversed interatrial shunt	5	2·5
Tricuspid atresia	6	3
Eisenmenger's complex	2	1
Transposition of the great vessels	2	1
Others	16	8
Total	200	100

Clinical Features

In attempting to make a bedside diagnosis of the precise nature of any case of suspected congenital heart disease, due consideration should be given to 10 major items, all of which have multiple facets.

1. Other Congenital Stigmata

Mongolism and arachnodactyly are well-recognized associations, but in their complete form are uncommon. Partial arachnodactyly, especially high arched palate and pigeon chest, however, is common. Brown also stresses accessory nipples. When the diagnosis rests between normality, congenital heart disease, or acquired heart disease, any such stigmata favour a congenital anomaly.

2. Effort Intolerance

Breathlessness may be divided into four grades: (1) slight—the patient attempts to compete with his fellows, but is always at a disadvantage; (ii) moderate—he is obviously breathless on effort, but can walk several miles; (iii) severe—he can walk only several hundred yards, certainly not more than a mile; and (iv) gross—incapacitated and cannot walk 100 yards.

Squatting (Taussig, 1947) should always be noted. It is especially common in Fallot's tetralogy, but not limited to it. It occurred in practically every cyanotic form of congenital heart disease in this series, but whereas it was recorded in two-thirds of those with Fallot's tetralogy, it was mentioned in only one-quarter of the others. It was noted only once in an acyanotic case (severe pulmonary stenosis).

Angina pectoris and syncope were rare, but occurred occasionally in severe pulmonary stenosis with or without reversed interatrial shunt. Angina occurred in three of the six cases with idiopathic pulmonary hypertension, and syncope in one of them.

Palpitations had a nuisance value in several severe cases of patent ductus, and in a few advanced cases of atrial or ventricular septal defect.

3. Cyanosis

It is usual to grade the intensity of cyanosis and clubbing so that some idea of their degree may be recorded. Central cyanosis is best seen on warm surfaces such as the conjunctivae, the inner side of the lips, the palate, and the tongue. Peripheral cyanosis may occur on exposed surfaces which may be cold, such as the nose, ears, face, outer side of the lips, and hands. The distinction is very important. Clubbing always means central cyanosis when other causes can be excluded.

Polycythaemia is also recorded under this heading, and usually implies central cyanosis; but it sometimes helps to compensate for an extremely low cardiac output.

Central cyanosis in congenital heart disease means a veno-arterial shunt. It may occur, however, in the late stages of primary pulmonary hypertension, and of course in anoxic cor pulmonale.

4. Pulse

A small pulse is characteristic of all the severe cyanotic and severe acyanotic forms of congenital heart disease except patent ductus, aorto-pulmonary septal defect, and perforated aortic sinus, when it is water-hammer in quality. It is normal in mild cases in both groups. In the absence of aortic incompetence Corrigan's sign provides valuable evidence in favour of patent ductus or its near relatives. Both water-hammer pulse and Corrigan's sign were present in 18 out of 22 such cases in which they were looked for.

Hypertension is limited to coarctation of the aorta, and then, of course, it can be detected only in the upper extremities. The blood pressure was normal in all other conditions except the ductus group, although the pulse pressure was small in the most severe cases. In the ductus group the diastolic pressure was significantly reduced in the majority.

5. Jugular Venous Pressure

The general level of the jugular venous pressure was usually normal, excluding cases of heart failure; but it tended to be within the upper limits of normal or even slightly raised in the group with arteriovenous shunt and in cases of simple pulmonary stenosis or idiopathic pulmonary hypertension. It was slightly raised in 4 out of 28 cases of Fallot's tetralogy.

Giant *a* waves were conspicuous in the neck in the most severe cases of simple pulmonary stenosis with or without reversed interatrial shunt. These were easily recognized and distinguished from the well-known venous pulse of tricuspid incompetence by their presystolic timing, by their abrupt and collapsing quality (venous Corrigan), and by the fact that they represented a pressure far above that of the *c* and *v* waves. In two cases they were transmitted to the liver. Giant *a* waves may also be seen in acquired tricuspid stenosis and severe primary or secondary pulmonary hypertension, but rarely in other conditions. They resemble in quality, but not in timing, the cannon waves of heart-block. They are not seen in uncomplicated A.S.D., V.S.D., patent ductus, aortic stenosis, or mitral incompetence.

6. Pulsation

The quality of the cardiac impulse is very important. It may be described as normal (gentle left ventricular thrust), heaving (from a hypertrophied left ventricle), hyperdynamic (a quick tumultuous thrust), or tapping. It is believed that the tapping cardiac impulse represents absence of pulsation at the apex beat associated with an easily palpable first heart sound. This may result from clockwise rotation or from enlargement of the right ventricle, usually both. It is characteristic of A.S.D., Fallot's tetralogy, and severe pulmonary stenosis. A hyperdynamic left ventricular thrust is characteristic of patent ductus and V.S.D. Occasionally a tumultuous cardiac impulse is due to a grossly hyperkinetic right ventricle in A.S.D. (Roesler, 1934).

When the left ventricle is enlarged the normal precordial systolic retraction tends to be exaggerated. When the right ventricle is enlarged there is a diffuse lift in the third and fourth spaces between the sternum and the nipple line. This lifting outflow tract or conus is very rarely recorded in hospital notes, yet it is highly important, and is probably the best clinical evidence available of an enlarged right ventricle.

Systolic pulsation in the second left space offers good evidence of a dilated pulmonary artery, and is a most helpful and reliable physical sign. It was recorded positively in 7 out of 25 cases of A.S.D. in this series, but negatively only twice, and was never seen in any form of pulmonary stenosis. Occasionally, however, it may be due to a large aorta, as in pulmonary atresia, or to a persistent truncus.

7. Murmurs and Thrills

The significance of the site, intensity, and conduction of most murmurs and thrills is well recognized and needs little comment. But more attention should be paid to functional murmurs; particularly to the Graham Steell murmur of pulmonary incompetence, which was heard in 13 out of 25 cases of A.S.D. in this series, and which always indicates a dilated pulmonary artery; and to the mitral diastolic murmur that denotes a torrential mitral blood flow—this was heard in 16 out of 18 cases with either a large patent ductus or a large V.S.D. There can be no doubt that it is functional, for it disappears immediately the ductus is ligated. Phonocardiograms show that it follows the third heart sound at the mitral area and is indistinguishable in timing, quality, intensity, and duration from the mitral diastolic murmur associated with mitral valvulitis.

8. Second Heart Sound

It is nearly always possible to distinguish two components of the second heart sound in normal children and in most healthy adults who are neither emphysematous nor over weight, particularly during inspiration. In other words, the second heart sound is normally split. The first component represents aortic valve closure, the second pulmonary valve closure. The second heart sound is usually single in the neck, at the aortic area, and at the cardiac apex—at these sites only the aortic element is normally heard. At the pulmonary area both elements are heard, and the loudest is usually the aortic. Phonocardiograms taken by Dr. Aubrey Leatham confirm the clinical view that the pulmonary valve normally closes after the aortic. The significance of this fact will not be overlooked, for it offers a bedside method of detecting pulmonary hypertension, pulmonary hypotension, and right bundle-branch block (or its functional equivalent).

Thus in primary or secondary pulmonary hypertension the second element of a normally split second heart sound is usually obviously accentuated; in Fallot's tetralogy the second sound at the pulmonary area is always single and usually loud—it is the aortic sound that is heard and the vessel is not covered by the pulmonary artery; in severe simple pulmonary stenosis the pulmonary element is also absent, but may be present in mild cases; in A.S.D. with functional right branch block or its electrocardiographic equivalent, and a grossly overfilled right ventricle, the second heart sound is widely split and the second or pulmonary element is but little accentuated. No sign will repay closer study than the second heart sound at the pulmonary area. It is believed that Helen Taussig (1947) was the first to point out the value of hearing a split second sound, stating that it offered clear evidence of the existence of both great vessels.

9. The Electrocardiogram

The important findings in congenital heart disease include the P pulmonale, evidence of left or right ventricular preponderance, and appearances resembling partial or complete right bundle-branch block. The P pulmonale is common, and therefore not very helpful, in all cyanosed cases, but in acyanotic cases it usually means pulmonary stenosis or severe pulmonary hypertension. It is never conspicuous in uncomplicated A.S.D., V.S.D., or patent ductus.

The electrocardiogram is the most reliable clinical means of deciding which ventricle is predominant, and the point is of the utmost importance in differential diagnosis. Details cannot be discussed here.

Partial or complete right bundle-branch block occurs in 95% of all cases of A.S.D., the clinical diagnosis of which is almost untenable in its absence.

10. X-ray Appearances

The most valuable recent addition to well-known radiological signs is perhaps the recognition of overfilled or underfilled peripheral pulmonary arteries. Pulmonary plethora (Plate, Fig. 1) occurs in A.S.D., V.S.D., patent ductus, and transposition of the great vessels; pulmonary ischaemia (Fig. 2) in all cyanotic cases with veno-arterial shunt, including Eisenmenger's syndrome. The difference is very obvious and does not necessarily bear any relation to the size of the pulmonary artery itself or to its main left and right branches; thus dilatation of the pulmonary artery itself without pulmonary plethora occurs in pulmonary valve stenosis, pulmonary hypertension, and

Eisenmenger's complex; on the other hand, diminutive main pulmonary arteries occur only when the pulmonary blood flow is reduced.

Another point of great importance is the quality of pulmonary artery pulsation: whether it is abrupt and collapsing as in A.S.D. and pulmonary incompetence, or whether it is relatively slow-rising and sustained as in pulmonary stenosis (Wells, 1950).

Coarctation of the Aorta

Of the 16 cases in the series 8 were male and 8 female. Their ages ranged from 5 to 47. The findings were characteristic, and there is very little to add to the well-known clinical picture.

Patent ductus was associated in one, V.S.D. in two, and aortic stenosis in one (possibly two). The coarctation was of the usual adult type in all of these.

A mitral diastolic murmur was heard in no fewer than 9 of the 16 cases. There was a ready explanation for it in five (ductus, 1; V.S.D., 2; calcific mitral stenosis, 1; and active rheumatic carditis, 1). But there was no explanation for it in the other four; there was no rheumatic history, and the murmur disappeared after surgical repair in one of them. The contrary evidence that an unexplained mitral diastolic murmur may persist after successful surgical repair is still lacking. According to Brown, cases of coarctation of the aorta, like cases of A.S.D., are peculiarly apt to develop rheumatic mitral valvulitis in childhood, and at present there is no better explanation to offer.

A radiological sign that too often escapes notice is the double aortic knuckle (Fig. 3) described by Bramwell (1947) and others. This at once distinguishes coarctation from obstruction lower down.

Retrograde aortography was carried out on three cases, but the results were little better than those obtained by the intravenous route, and the procedure is probably more dangerous. Good aortograms are essential, however, so that cases which are anatomically unsuitable for repair need not be subjected to thoracotomy.

The mortality rate for Crafoord's operation is now 10–16% (Gross, 1949; Shapiro, 1949).

Patent Ductus Arteriosus

There were 29 cases of patent ductus in the series—21 female and 8 male. Only one was seriously incapacitated, but five others had moderate breathlessness and complained of palpitations.

Of the physical signs, Corrigan pulsation in the neck, a water-hammer pulse, a normal venous pressure and pulse, a thrusting hyperdynamic left ventricular cardiac impulse, a high continuous murmur in the first and second left intercostal spaces, a normally split (when not obscured) second heart sound at the base, often with some accentuation of the pulmonary element, and a functional mitral diastolic murmur were the most important. The electrocardiogram showed normal P waves, a varying degree of left ventricular preponderance, and no bundle-branch block. S waves were always dominant in Lead V_1, and a small secondary R wave was seen only once; but the main R wave in this lead was sometimes notched, and S was occasionally slurred. The most severe cases showed T-wave inversion in left ventricular surface leads or their equivalents, and one patient had auricular fibrillation, which reverted to normal rhythm after ligation of the ductus. Skiagrams usually revealed left ventricular enlargement, pulmonary plethora, and a varying degree of dilatation of the pulmonary artery.

The mildest cases showed no abnormality apart from the Gibson murmur. Nine out of ten severe cases had a functional mitral diastolic murmur which disappeared immediately the ductus was ligated. Two patients did not have a continuous murmur at any time, and in two others the murmur was atypical and was thought by some observers to be absent in one of them and discontinuous in the other. The two without the classical murmur were the most severe in the series. Both were proved by cardiac catheterization and subsequent ligation of the ductus. Four acyanotic patients with continuous murmurs did not have a patent ductus. Two had aorto-pulmonary septal defects, and two had a perforation of the aortic sinus—one into the pulmonary artery and one into the right ventricle. Several other continuous murmurs were heard in acyanotic patients during the two-and-a-half-year period under review, but have been excluded from the series. Some represented a venous hum and were louder in the neck. One was due to a needle causing an aorto-pulmonary fistula; another was caused by an arteriovenous aneurysm in the lung. No case of coronary arteriovenous aneurysm was encountered.

The venous hum is accentuated when the patient sits up and may be abolished by compressing the jugular vein at the root of the neck. Continuous murmurs due to aorto-pulmonary septal defects or to a perforated aortic sinus tend to be loudest a little lower than the classic ductus murmur; they are also extremely coarse and accompanied by a gross thrill. Both cases of perforated aortic sinus in this series developed during or after an attack of bacterial endocarditis.

Arteriovenous aneurysm of the lung usually causes cyanosis; if not, it may yet be recognized by means of pulmonary angiocardiography and by finding a lowered arterial oxygen saturation. Coronary arteriovenous aneurysm should show an unusually high oxygen content in samples obtained from the coronary sinus.

Cardiac catheterization was undertaken in 13 cases. Mean pressures in the pulmonary artery were normal in four and raised, often considerably, in nine (Table II).

TABLE II.—*Patent Ductus*

Case No.	Age	Mean Pressure (mm. Hg)		% O_2 Saturation		Ratio of Pul. to Systemic Flow	Approx. Pul. Resistance $\left(\frac{\text{P.A. Pressure}}{\text{Pul. Flow.}}\right)$
		R.V.	P.A.	S.V.C., R.A., and R.V.	P.A.		
1 H	6	18	32	63	83	3:1	2·0
2 H	9	12	17	65	80	2:1	1·7
3 67	18	16	24	53	75	2·5:1	2·0
4 69	8	30	52	68	81	2:1	5·0*
5 74	9	7	7	69	81	2:1	0·7d
6 76	35	19	40	52	85	6·5:1	1·25d
7 87	9	33	48	69	87	3·7:1	2·5
8 125	32	9	13	72	80	1·7:1	1·4
9 126	8	24	37	62	73	1·5:1	5·0*
10 143	23	30	65	69	86	2:1	6·0*
11 116	5	27	47	65	87	3·5:1	2·8
12 5B	4	10	13	69	86	2·7:1	1·0 d
13 7B	13	8	12	67	83	2·2:1	1·0 d

* Increased resistance. d = Diminished resistance.

There was some relationship between the height of the pressure and the size of the shunt, but it was not close. The peripheral resistance in the lungs was variable: it was reduced in four, normal in six, and raised in three. When it was low a relatively large shunt was associated with a relatively low mean pressure in the pulmonary artery; when it was high a relatively small shunt was associated with a high pressure in the pulmonary artery. Only when the peripheral resistance was normal was the pressure proportional to the shunt (Fig. A). This, of course, is obvious and may be calculated by the formula B.P. = T.P.R. × C.O., which applied here becomes: pulmonary artery pressure = pulmonary peripheral resistance × pulmonary blood flow.

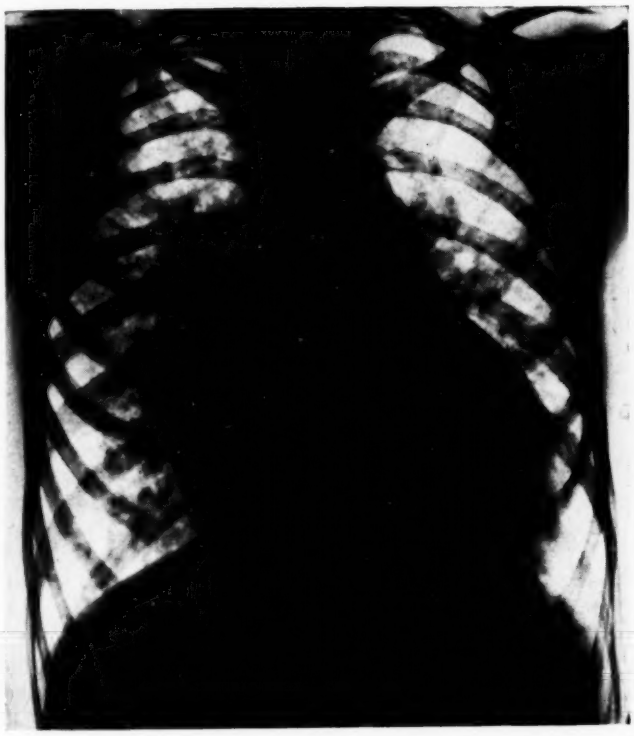

FIG. 1.—Pulmonary plethora in a case of V.S.D.

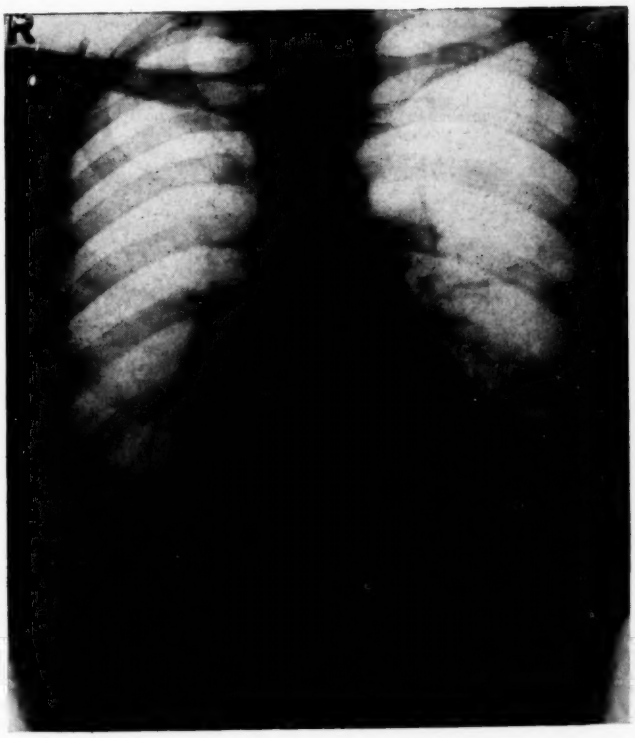

FIG. 2.—Pulmonary ischaemia in a case of Fallot's tetralogy.

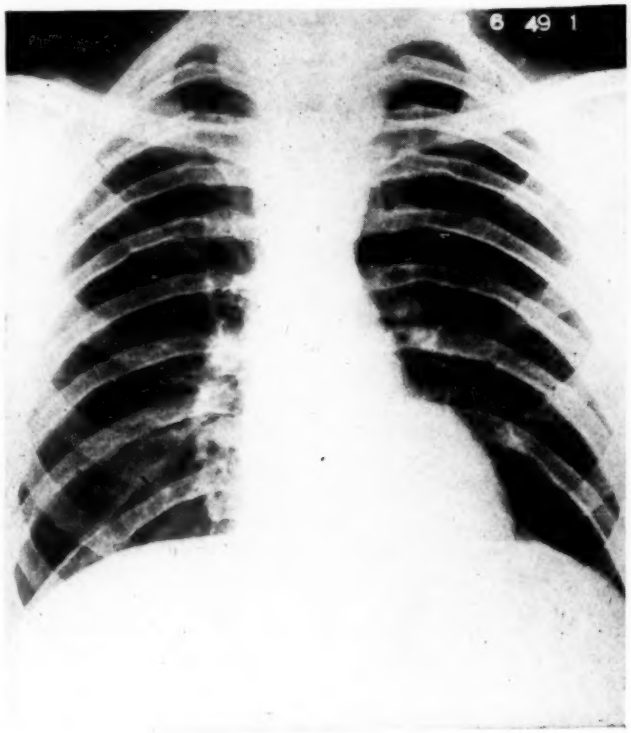

FIG. 3.—Coarctation of the aorta showing a double aortic knuckle.

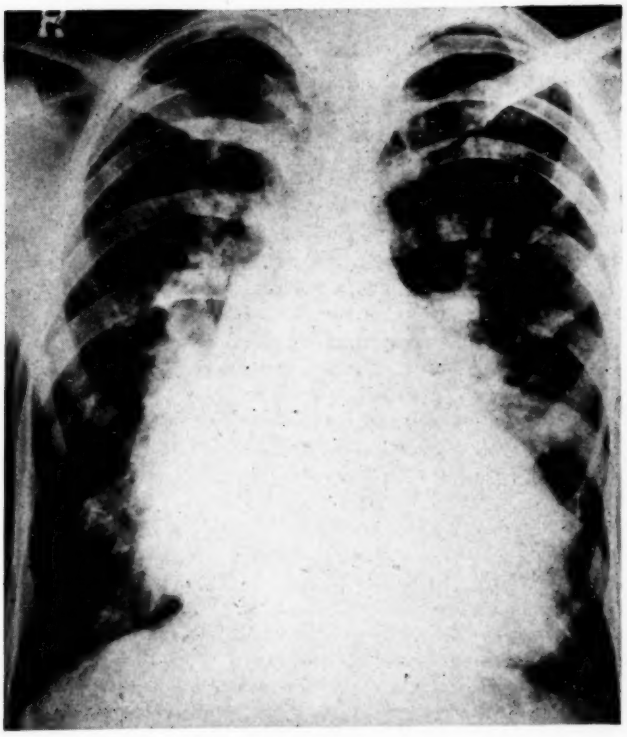

FIG. 4.—*X*-ray appearances in V.S.D., showing pulmonary plethora and left ventricular enlargement.

GEORGE LUMB: DIFFUSE EOSINOPHILIC ARTERITIS

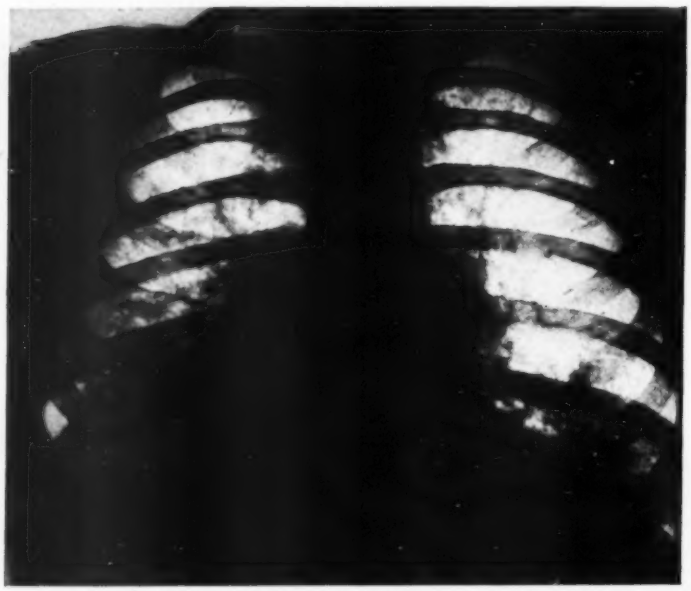

FIG. 1.—Radiograph of chest taken on June 20, 1949.

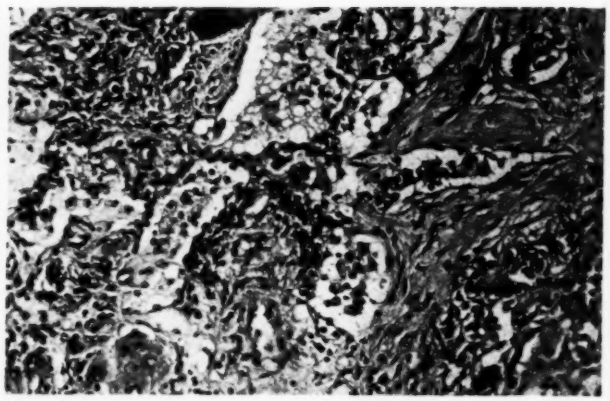

FIG. 2.—Lung. Fibrosis, giant-cell formation, and eosinophilic infiltration.

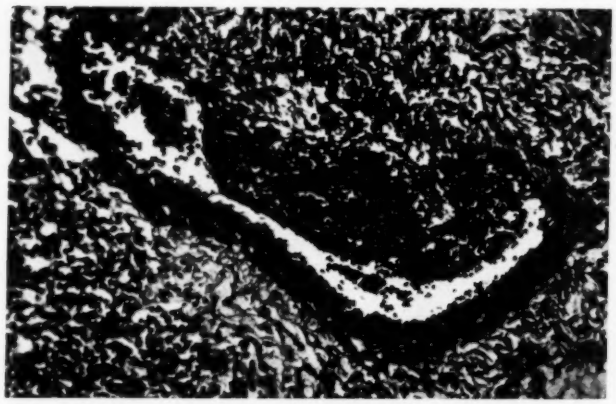

FIG. 3.—Lung. Necrosis and eosinophilic infiltration of the wall of a vessel. (× 150.)

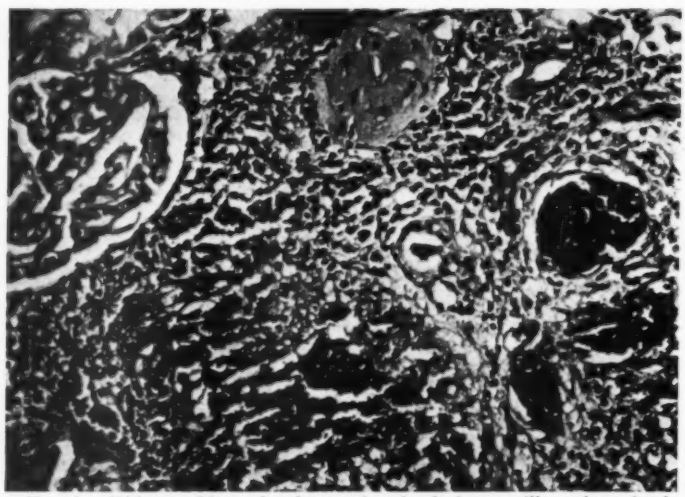

FIG. 5.—Kidney. Necrosis of convoluted tubules, capillary thrombosis in a glomerulus, and eosinophilic infiltration of the interstitial tissue. (× 150.)

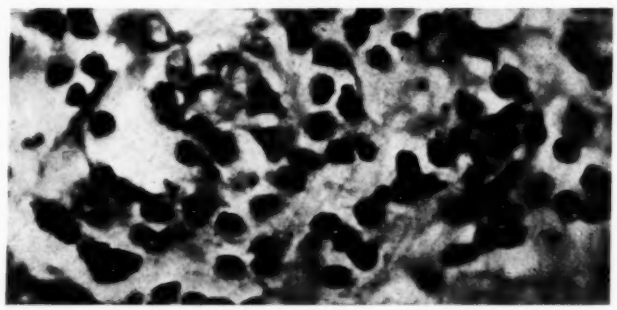

FIG. 4.—Heart. High-power view of eosinophils. (× 240.)

L. J. MAHONEY AND H. J. BARRIE: ADRENAL INSUFFICIENCY AFTER SURAMIN

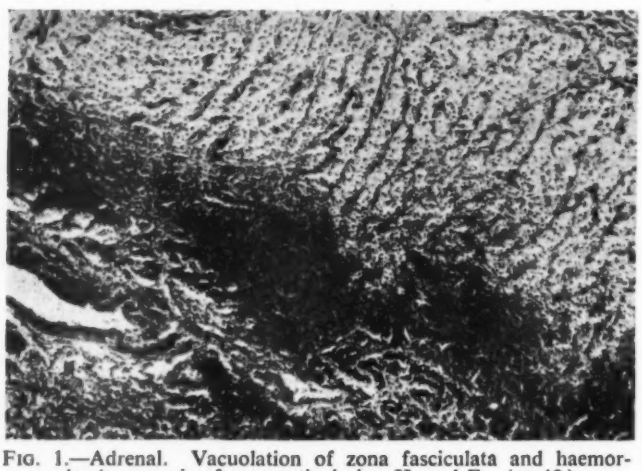

FIG. 1.—Adrenal. Vacuolation of zona fasciculata and haemorrhagic necrosis of zona reticularis. H. and E. (× 45.)

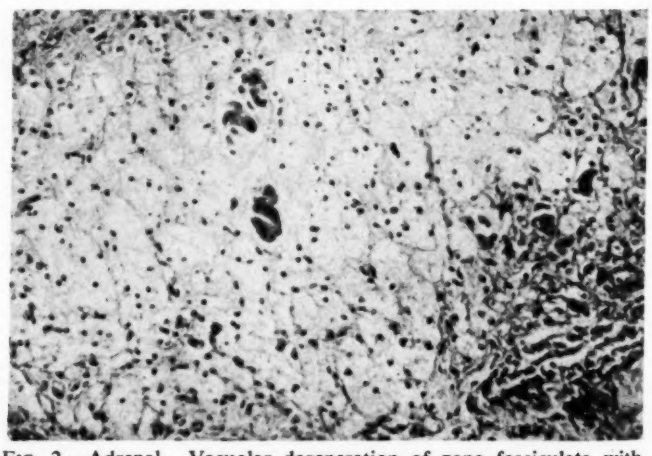

FIG. 2.—Adrenal. Vacuolar degeneration of zona fasciculata with isolated islands of autolysing cells. H. and E. (× 115.)

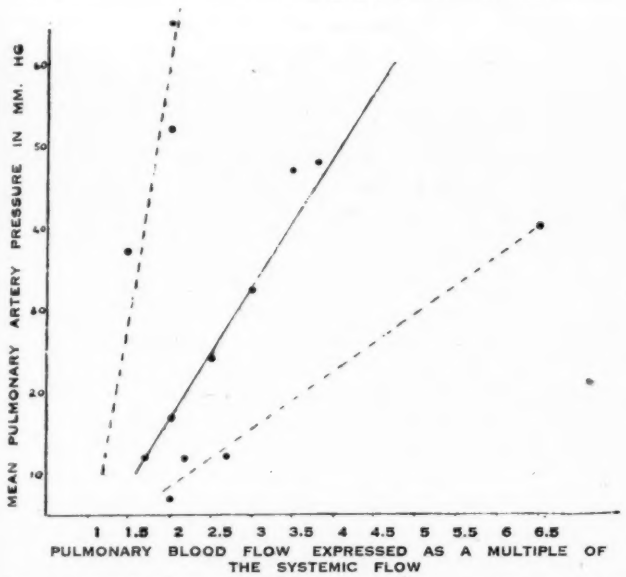
MEAN PULMONARY ARTERY PRESSURE IN MM. HG
60
50
40
30
20
10
1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5
PULMONARY BLOOD FLOW EXPRESSED AS A MULTIPLE OF THE SYSTEMIC FLOW

FIG. A.—Graph illustrating the relationship of the pulmonary blood flow to the pulmonary artery pressure in patent ductus.

To the three patients with true pulmonary hypertension mentioned (aged 8, 8, and 23) must be added a fourth (a girl of 12) who was catheterized only a year after successful ligation. Her mean pulmonary artery pressure was then 33 mm. Hg. above the sternal angle. The prognosis of these cases should be guarded, for the hypertension may be irreversible; on the other hand, before ligation a moderate increase of peripheral pulmonary resistance may be beneficial, for it reduces the size of the shunt and the work of the left ventricle. By far the worst case (a woman of 35) in this series had a low normal resistance. Another point that emerges is that three of those with true pulmonary hypertension were younger than the average of those without, which was 14.

It is clear that the duration of the shunt does not determine whether the peripheral resistance rises or not, but some other factor. Should the resistance rise precipitously, reversal of the shunt is theoretically possible, and this might occur in childhood. The point will be discussed again in relation to Eisenmenger's complex.

The pulmonary blood flow was usually two to four times the systemic flow—that is, about 10–20 litres a minute. The whole of the extra work entailed in pumping the shunted blood falls on the left ventricle. The systemic flow (and therefore the right ventricular output) was usually a high normal (5–6 litres a minute).

Differential Diagnosis

1. *Aorto-pulmonary Septal Defect or Perforation of an Aortic Sinus into the Pulmonary Artery.*—Apart from the fact that the thrill and murmur are especially coarse and loud, respectively, and tend to be maximal in the third rather than the second intercostal space, there is nothing to distinguish this condition from patent ductus. Cardiac catheterization revealed the same kind and degree of shunt in three cases studied, and angiocardiography has not helped. If the onset of the thrill and murmur can be dated to an attack of bacterial endocarditis, however, a perforated aortic sinus may be diagnosed with confidence.

2. *Perforated Aortic Sinus into the Right Ventricle.*—Only one case was encountered. The clinical findings were similar to those of patent ductus, but the continuous thrill and murmur were distinctly lower, being maximal in the fourth space. Cardiac catheterization proved that the shunt was from the aorta to the right ventricle, pressures and samples being similar to those found in cases of V.S.D.

3. *Other Causes of a Continuous Murmur.*—These include a jugular venous hum, and arteriovenous aneurysm of the lung or of coronary, intercostal, or internal mammary vessels. These have already been discussed.

4. *Rheumatic Aortic Incompetence and Mitral Stenosis.*—The combination of a water-hammer pulse, systolic and diastolic murmurs at the base, left ventricular enlargement, and a mitral diastolic murmur with or without slight enlargement of the left auricle may occur in rheumatic heart disease or patent ductus, and the distinction between the two occasionally presents difficulty: this is when opinion differs about whether the basal murmur is to-and-fro or continuous, or when a continuous murmur is missing in a case of patent ductus with pulmonary incompetence. The presence or absence of a rheumatic history or of other rheumatic manifestations and of radiological evidence of pulmonary plethora should prevent error. If there is still doubt, cardiac catheterization should be performed.

5. Ventricular septal defect with aortic incompetence gives rise to a water-hammer pulse, a systolic and diastolic basal murmur, left ventricular enlargement, a functional mitral diastolic murmur, and pulmonary plethora. The differential diagnosis rests entirely on the site and timing of the thrill and murmur, and if these should be atypical serious error resulting in ill-advised thoracotomy may result. Moreover, cardiac catheterization in V.S.D. occasionally yields data compatible with patent ductus plus pulmonary incompetence.

Treatment

Surgical ligation is advised in all severe cases of patent ductus, and in all infected cases after preliminary penicillin treatment. As the operative mortality is still 2–3%, mild uncomplicated cases should be left alone. Whether moderate cases are ligated or not often depends on the attitude of the parents or patient; on the whole they are probably best ligated.

Ventricular Septal Defect

There were 24 cases with uncomplicated V.S.D.—11 male and 13 female. Their ages ranged between 3 and 55, 15 of them being children under 12 years old, 5 adolescent, and 4 adult. The majority were symptom-free, but five could not compete physically with their fellows, and one (aged 5) had congestive failure.

The important physical signs included a small or normal peripheral pulse, a normal jugular venous pressure without a conspicuous *a* wave, a thrusting hyperdynamic left ventricular type of cardiac impulse, a lifting right ventricular outflow tract and pulsating pulmonary artery, a Roger murmur and thrill, a normally split second heart sound at the pulmonary area (if not obscured by the murmur) with accentuation of the pulmonary element, and a functional mitral diastolic murmur.

Mild cases showed little but the Roger murmur and thrill. The least common sign in the more severe cases was detectable pulsation of the pulmonary artery.

A thrill accompanied the Roger murmur in every case. It was maximal in the fourth or third and fourth intercostal spaces in all but three, when it was maximal in the second (two) or second and third (one) spaces. In two patients it was unusually far to the left towards the apex beat and could have been mitral in origin. A mitral diastolic murmur was distinct in 10 out of 12 relatively severe cases, and was heard by some observers (but not by

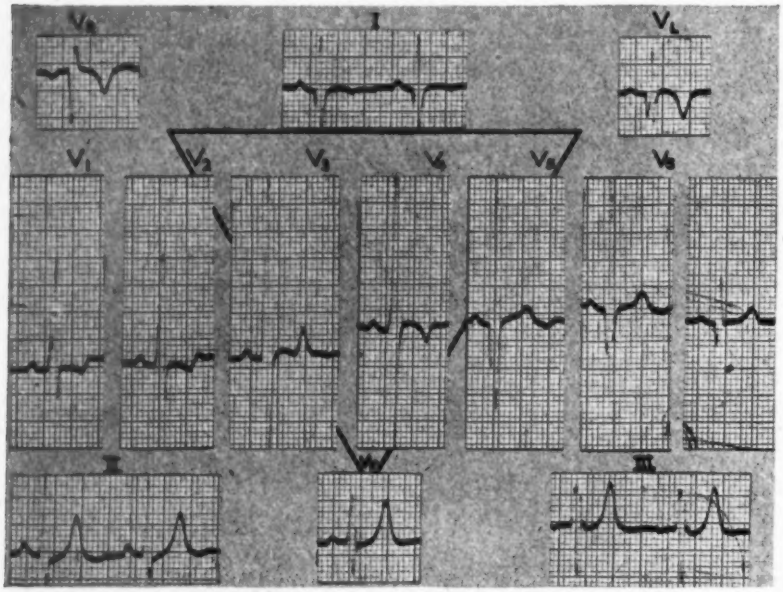

FIG. B.—Electrocardiogram in a case of V.S.D. showing large Q waves, tall R waves, and inverted U waves in left ventricular surface leads; and tall secondary R waves and inverted T waves in right ventricular surface leads.

me) in one of the other two. It was also heard in two relatively mild cases. A Graham Steell murmur from functional pulmonary incompetence was heard in four patients, and what was believed to be an aortic diastolic murmur in a fifth.

The electrocardiogram showed normal P waves, and QRS complexes that sometimes resembled the appearances in A.S.D. and sometimes those of patent ductus, but which as a rule lay somewhere between the two. Thus there might be prominent Q waves, tall R waves, and inverted U waves in left ventricular surface leads (Fig. B), and yet V_1 might show a well-formed secondary R wave. Partial right bundle-branch block, indistinguishable from that in A.S.D., was seen in three cases. In mild "maladie de Roger" the electrocardiogram was normal.

X-ray appearances were indistinguishable from those of patent ductus. Pulmonary plethora and left ventricular enlargement were very conspicuous in the more severe cases (Fig. 4).

By all standards at least 13 of the 24 cases were severe. Only four showed nothing but the characteristic Roger thrill and murmur.

Cardiac catheterization was undertaken in 16 cases. The mean pulmonary artery pressure was raised considerably in six, slightly in four, and was normal in six (Table III). As with patent ductus, the height of the pressure did not parallel the size of the shunt at all closely but depended on the pulmonary peripheral resistance: this was increased in four cases, decreased in four, and normal in eight. The patient with the largest shunt had a low resistance, and three of the four patients with high pressures had only average shunts (Fig. C). The pulmonary blood flow was usually at least double the systemic flow, being of the order of 10–15 litres a minute, but in four mild cases it was only about one and a half times the systemic flow. The contention that very mild cases of "maladie de Roger" may not be detectable by the method of cardiac catheterization is difficult to dispute in the absence of necropsies, but seems improbable.

Angiocardiography was carried out in the patient with the highest pulmonary artery pressure to see if transient reversal of the shunt could be demonstrated. The mean pulmonary artery pressure was 95 mm. Hg, and the systemic blood pressure 160/100 mm. Hg, there being associated coarctation of the aorta. No reversal of shunt could be seen in the angiocardiogram. Nevertheless reversal of the shunt is likely to occur in rare cases that develop an extremely high pulmonary resistance (see under Eisenmenger's syndrome).

TABLE III.—*Ventricular Septal Defect*

Case No.		Age	Mean Pressure (mm. Hg)		% O_2 Saturation				Ratio of Pul. to Systemic Flow	Pul. Resistance $\left(\frac{\text{P A Pressure}}{\text{Pul. Flow}}\right)$
			R.V.	P.A.	R.A.	Low R.V.	High R.V.	P.A.		
1	36	19	11	13	56	70	75	75	2:1	1·3
2	51	55	18	18	58	—	75	71	1·7:1	1·8
3	56	6	54	95†	49	63	63	83	3·5:1	5·4*
4	T	27	29	—	59	81	—	—	3:1	(?3)
5	85	15	13	18	70	83	86	82	2:1	1·8
6	94	11	43	73	72	86	82	81	1·9:1	7*
7	102	24	24	42	56	82	84	85	4·3:1	2
8	139	7	9	10	72	78	81	81	2:1	1d
9	145	8	9	11	76	75	83	82	1·4:1	1·5
10	160	6	12	18	73	85	82	84	1·7:1	2
11	166	6	6	7	73	82	82	83	2:1	7d
12	167	28	12	14	64	81	81	83	2·5:1	1d
13	161	11	8	12	74	73	72	78	1·3:1	1·5
14	7B	15	34	71	69	81	—	81	2:1	7*
15	163	3	9	11	66	—	77	77	1·6:1	1d
16	169	6	37	61	68	86	86	83	2·5:1	5*

* Increased pulmonary resistance. d = Diminished pulmonary resistance.

Differential Diagnosis

The clinical diagnosis of V.S.D. by specialist physicians was often incorrect, and many cases of V.S.D. had been diagnosed otherwise. Thus, of 33 cases proved by means of cardiac catheterization, 17 had been diagnosed as uncomplicated V.S.D.

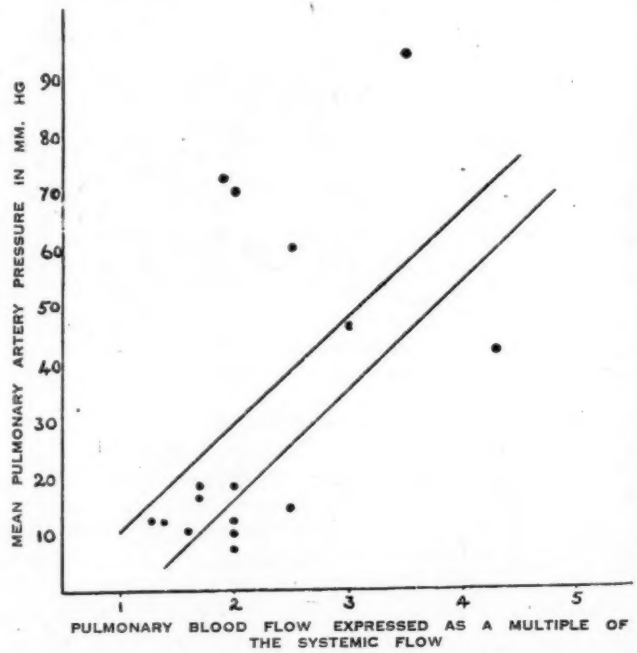

FIG. C.—Graph showing the relationship of the pulmonary blood flow to the pulmonary artery pressure in V.S.D.

in error, 7 with V.S.D. had been diagnosed otherwise, and 9 were correctly diagnosed as having V.S.D. The chief sources of confusion in suggested mild cases were innocent left parasternal murmur, simple pulmonary stenosis, subaortic stenosis, and organic mitral incompetence; and in cases with pulmonary plethora, patent ductus, and A.S.D.

If there is no thrill, a left parasternal murmur unaccompanied by any of the clinical features of V.S.D. mentioned above should be regarded as innocent.

Simple pulmonary valvular stenosis can usually be distinguished by the higher position of the thrill and murmur, by the softness of the pulmonary element of the second heart sound (if it can be heard at all), by the tapping cardiac impulse, and by dilatation of the pulmonary artery in the absence of pulmonary plethora. Subvalvular stenosis is more difficult, because turbulence may then be lower and the pulmonary artery may not be dilated; but the second heart sound and the quality of the cardiac impulse should prevent mistakes. Severe pulmonary stenosis is easily distinguished by the electrocardiogram. Mild subaortic stenosis may be clinically indistinguishable from the "maladie de Roger" if the murmur and thrill are low; if the left ventricle is enlarged, however, absence of other evidence of V.S.D. strongly favours subaortic stenosis.

Organic mitral incompetence with left ventricular enlargement, a mitral diastolic murmur, and a systolic thrill and murmur rather centrally placed may deceive the most experienced; but skiagrams should reveal the tell-tale systolic expansion of the left auricle if there is mitral incompetence, and pulmonary plethora if there is V.S.D.

Patent ductus without a Gibson murmur should be recognized by the peripheral pulse. Confusion is scarcely possible unless V.S.D. is complicated by aortic incompetence; and if systolic turbulence then happens to be high, real difficulty may be encountered. Clinical or electrocardiographic evidence of right ventricular dilatation (as well as left) favours V.S.D.

Atrial septal defect with a relatively low systolic thrill and murmur, and with a hyperdynamic right ventricle forming the apex beat, may closely simulate V.S.D. But the second heart sound is much more widely split in A.S.D., and the pulmonary element is not accentuated. Moreover, the Roesler type of thrusting cardiac impulse is much less common in A.S.D. than was at one time thought: in clinical diagnosis few mistakes will be made if a left ventricular type of cardiac impulse is accepted at its face value.

Terminology

It is suggested that the term "maladie de Roger," if retained at all, should be applied only to mild cases showing nothing more than the Roger murmur and thrill. The majority of cases of V.S.D. present a very different picture from that described by Roger himself and from all textbook descriptions of the "maladie de Roger." Nor is Taussig's classification of high and low defects acceptable. She regards cases with pulmonary plethora and dilated pulmonary arteries as examples of high V.S.D., the left ventricle pumping much blood almost direct into the pulmonary artery. She thinks that trivial shunts mean low V.S.D. This is incorrect. Selzer (1949) has already reviewed the literature from the pathological point of view and shown that only 10% of all cases of uncomplicated V.S.D. have low defects in the muscular septum and that these present no distinctive clinical features. In the present series cardiac catheterization has shown that high and low right ventricular samples are similar to one another and to samples from the pulmonary artery in nearly all instances (Table III); only in the mildest case was there any significant difference, and then the lowest sample was the least saturated.

(The conclusion of the paper will appear next week, with a full list of references.)

A circular from the Ministry of Health to local health authorities points out that many soldiers discharged from the Army on psychiatric grounds need social rather than medical aftercare. A special procedure has therefore been devised for these people as an experiment for one year. Army Form D.487, with which medical officers of health are familiar, will be marked "psychiatric aftercare" and sent to the M.O.H. of the area where the soldier will live. The local health authority should arrange for an initial visit to be paid to the ex-soldier by a social worker soon after the form is received. The authority may then arrange for aftercare services to be provided.

DIFFUSE EOSINOPHILIC ARTERITIS

BY

GEORGE LUMB, M.D.

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[WITH SPECIAL PLATE]

During the past years considerable interest has centred on the problems of tissue changes in conditions of allergic origin, and an increasing quantity of evidence has been collected demonstrating that certain abnormalities, such as vascular proliferative lesions, focal necrosis, and tissue oedema, are to be found in a variety of apparently different diseases linked only by the probability of their having an allergic background.

Essentially similar changes have been found in cases of rheumatic polyarthritis and polyarteritis nodosa (Bergstrand, 1946), whilst evidence of associated allergic skin phenomena have been demonstrated in these conditions; and the association of polyarthritis with clear-cut cases of polyarteritis nodosa is not unknown (Herlitz, 1930–1; Friedberg and Gross, 1934). Further, Rich and Gregory (1943) have shown that the lung lesions in rheumatic pneumonia are essentially similar to those found in cases in which hypersensitivity to sulphonamide drugs exists. There is also certain evidence (Salvesen, 1938; Ehrström, 1941) that glomerulo-nephritis—also considered to be of allergic origin—may, more often than was first supposed, be an associated factor in cases of rheumatism.

More recently, examples of vascular and tissue changes of a similar type, occurring particularly in the lungs, have been described in cases of asthma, and Wilson and Alexander (1945) have shown that 18% of their cases of polyarteritis nodosa had an associated bronchial asthma.

A group of cases has therefore emerged which, although presenting widely differing clinical pictures, has in common the possibility of a similar type of aetiology—namely, an allergic manifestation. Experimental proof of such a theory is so far lacking, and the threads of evidence which do exist are disappointingly inconclusive. Evidence of similar or related morbid anatomical and histological changes in the tissues of patients suffering from this group of diseases provides another method of approach to this problem which has been followed principally by Bergstrand. Opportunities for post-mortem examination have been scanty, for diseases of the asthma group are of relatively benign type, and it is considered justifiable to place on record a further case in which necropsy was performed and full clinical details are available, in order to add to the few examples of this type already in the literature.

Case Report

A married woman aged 33, with one healthy child aged 3, first consulted her doctor in the autumn of 1948 complaining of a cough which had been present for nine months. Previously she had been healthy, with no personal or family history of any complaint of an allergic nature. She gave a history of frequent streaking of blood in the sputum, and for two months she had suffered from dysphagia and hoarseness associated with a swelling of the thyroid gland, together with some increase of nervousness and irritability. She was admitted to hospital on October 10, 1948.

A blood count showed: Hb, 82%; red cells, 4,570,300; white cells, 7,400 (23% eosinophils). Sputum examined for tubercle bacilli was negative on three occasions, but 9% of the total number of nucleated cells were eosinophils. A radiograph of

the chest revealed no abnormalities. It was considered that a non-toxic goitre was causing some non-specific laryngitis which by this time had disappeared. Whilst in hospital the patient had a low-level pyrexia, which settled, and she was discharged improved on November 11.

Within a week of her leaving hospital laryngitis returned, and she was readmitted on December 29. The thyroid enlargement had increased and was giving rise to definite respiratory obstruction and dysphagia. Additional symptoms of swelling of the eyelids and oedema of the dorsum of the hands, together with chemosis of the conjunctivae, had manifested themselves. She was again running a low-grade pyrexia. The white cells numbered 13,200 (19% eosinophils). Subtotal thyroidectomy was performed on February 1, 1949, and histological examination showed no signs of toxicity. The patient was discharged improved after operation, but in April and again in June required hospital treatment on account of dyspnoea, dysphagia, and swelling of the eyelids. Each time a blood count was performed eosinophilia was revealed. On April 5 a radiograph of the chest showed for the first time abnormal irregular shadows in both lower zones, which had increased in size and distribution by June 20 (Plate, Fig. 1).

In view of her increasing dyspnoea at this time she was recommended for early admission to Westminster Hospital, where she arrived in the early evening of July 1 dyspnoeic but

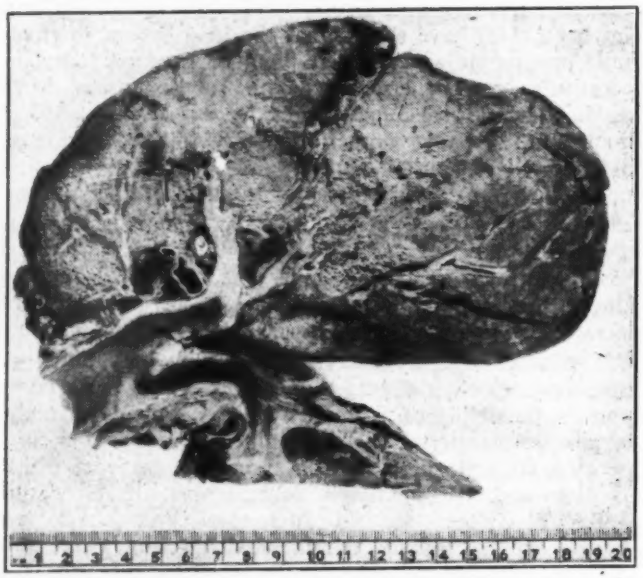

FIG. A.—Cut surface of lung, showing diffuse patchy consolidation.

not unduly distressed. She ate a reasonable dinner soon after admission, but three hours later became extremely distressed with inspiratory and expiratory stridor. Direct laryngoscopy revealed no obstruction and she finally lapsed into a coma and died 12 hours after admission.

Post-mortem Examination

This was performed three and a half hours after death. The body was that of a young woman in a good state of general nutrition. A well-healed scar at the site of thyroidectomy was seen in the neck. There was some oedema of the face, more marked on the right side than on the left, and considerable swelling of the right lacrimal gland caused prominence of the right eyelid.

Respiratory System.—The pharynx and larynx were filled with thick sticky mucopus, and the walls of the pharynx, larynx, trachea, and main bronchi were thickened and intensely oedematous. The mucous surface was flattened and very pale. The vocal cords were normal, and there was no abnormality in relation to either recurrent laryngeal nerve. Both pleurae showed easily broken-down adhesions, more marked on the right side, and at the right base a small collection of serous fluid was found. Both lungs were heavy and had an irregular shotty feel on palpation. Examination of the cut surface proved this to be due to very widespread irregular patches of consolidation of greyish yellow colour, involving the vast majority of the lung substance, with small intervening areas of compensatory emphysema (Fig. A).

Heart.—No abnormalities of valves or coronary vessels were found, and the musculature appeared normal on naked-eye examination, with the exception of one small area at the base of the left ventricle anteriorly, where it was very soft and yellowish in colour.

Spleen.—This was normal in size. The cut surface was rather pale and fatty, showing numerous scattered areas of greyish yellow infiltration varying in size from a pinhead to 0.5 cm. in diameter.

Kidneys.—These were normal in size, but scattered through the cortex were numerous yellowish areas of infiltration similar to those seen in the spleen and liver.

Thyroid.—A small remnant remained on the right side which was normal in appearance.

Lymphatic System.—Numerous enlarged lymph nodes were found in the neck, mediastinum, and para-aortic regions. The nodes were rubbery and discrete, and on the cut surface some of them had a yellowish appearance similar to the nodules in the liver, spleen, and kidneys.

The cause of death was considered to be acute respiratory obstruction associated with extensive bilateral pulmonary consolidation. The possibility of some bacterial infection of the lungs leading to a septicaemia was considered, but cultures taken from the blood, lungs, and the nodules in the spleen and kidneys were all sterile, and material injected into guinea-pigs and hamsters caused no abnormalities in these animals.

Microscopical Features

Lungs.—The normal architecture was replaced by a diffuse fibrous process showing irregular collagen bands and inflammatory cells, including numerous eosinophils, a few plasma cells, and some multinucleate giant cells (Fig. 2). Frequently the collagen strands were seen to be split up by oedema, and areas of hyaline degeneration were seen which failed to take up the aniline blue by Mallory's method or even to retain the first dye—in this case azocarmine. This collagen change has been described particularly in the so-called "Frühinfiltrat" of rheumatic pneumonia. Foci of necrosis were frequent and were invariably surrounded by a dense infiltration of eosinophils. Where an alveolar network remained signs of compensatory emphysema were seen. The bronchi were everywhere grossly thickened by oedema and infiltrated by eosinophils. The arterioles showed considerable intimal proliferation with thrombosis; necrosis of the wall with eosinophilic infiltration of the type found in polyarteritis nodosa was often seen (Fig. 3). Hyaline degenerative masses in the walls of the arterioles were a frequent finding.

Heart.—The myocardium showed a generalized degeneration of muscle fibres and these were widely separated by oedema and an infiltration of eosinophils. In the yellow area noted macroscopically focal necrosis with intense eosinophilic infiltration had occurred (Fig. 4).

Spleen.—There was a diffuse infiltration of eosinophils throughout the organ, and in the macroscopic yellowish areas focal necroses packed with eosinophils were seen. The majority of arterioles showed intimal proliferation.

Liver.—Accumulations of eosinophils were found around many portal tracts, and isolated cells of this type were found lying free in the sinusoids. No areas of necrosis were seen.

Kidneys.—Both had focal necrotic areas scattered in the cortex, where a few convoluted tubules had been destroyed and accumulations of eosinophils existed. Glomeruli were for the most part normal, but occasional capillary thrombi were seen (Fig. 5). The arterioles showed intimal proliferation and occasional thromboses, but no vascular necrosis was found.

Lymph Nodes.—The three lymph nodes examined revealed sinus catarrh with numerous eosinophils.

Lacrimal Gland.—This showed oedema and considerable infiltration by eosinophils.

Discussion

To summarize, one may say that here was a woman with no relevant family or past history, who had complained of cough for 18 months, and who gave a nine-months history of associated dyspnoea and dysphagia. Partial thyroidectomy had been performed five months before death, with apparent temporary relief. The first sign which might have led to the suspicion of an allergic background was the eosinophilia discovered nine months before death. The first time any specific lesion was found in the lungs was two and a half months before death, whilst the oedema of the face and hands began six months before death. The only attack which might have been called asthmatic was the terminal one during which the patient died.

The morbid anatomical and histological changes, however, seem to be identical with cases described by a number of authors under various titles, notably, Meyer-Dörken (1934), Harkavy (1943), Bayley *et al.* (1945), Bergstrand (1946), Smith (1948), and others. The generalized lesions found in the above case may be said to fall under three headings—namely, intimal proliferation, necrosis, and thrombosis of small vessels; focal necroses; and tissue oedema and eosinophilia.

The most striking lesions were the vascular changes in small arteries and the eosinophilia, which was constant in the peripheral blood throughout the course of the disease and was such a pronounced feature of the histological picture. For this reason in discussing this case I have decided to use the non-specific term diffuse eosinophilic arteritis rather than attempt to make any particular diagnosis.

In studying this case it is at once apparent that there are certain similarities to a number of other conditions. Thus the vascular changes are almost identical with those seen in polyarteritis nodosa. The focal necroses which have not been described in this latter condition are common, however, in other conditions in which hypersensitivity plays a part, as, for instance, after the use of sulphonamide drugs (Lederer and Rosenblatt, 1942). In this connexion it is interesting to note that, despite the patient's pyrexia, no drug of this group was at any time administered. The lung fibrosis is reminiscent of rheumatic pneumonia, and the eosinophilia and oedema are common findings of allergic phenomena.

It is difficult to escape the conclusion that the changes described both in this case and in the literature represent not a particular disease syndrome but a non-specific tissue reaction of allergic type which may vary from the benign lesions of the so-called Loeffler's syndrome (von Meyenberg, 1942) to lethal conditions such as the one described here. Examples of intermediate pathology may be quoted from the numerous varieties and gradations of polyarteritis nodosa.

In the cases of rheumatism, hypersensitivity to sulphonamide drugs, and nephritis many data exist concerning the exact precipitating factors, whereas in conditions such as polyarteritis nodosa no such evidence is yet forthcoming.

The above record is therefore presented as one of violent allergic reaction to some unknown precipitating stimulus, with widespread lesions of a type seen in a number of other conditions, and which it is perhaps justifiable to regard as representing part of the general pathology of the allergic state.

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OBSERVATIONS ON SYMPTOMATOLOGY AND TREATMENT OF CERVICAL EROSION

BY

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The large number of cases of cervical erosion seen in this out-patient department has focused attention on that condition, which was present in 36% of all the cases seen there from April, 1947, to June, 1949—some 870 cases of erosion in all. This prevalence may be due in part to the lack of post-natal care in the surrounding districts, though Fulkerson (1926), in his study of all cases attending the gynaecological department of the Cornell University Medical School, found that the incidence of cervicitis with erosion was 33%.

All patients were subjected to speculum examination of the cervix, and diagnosis was by direct observation either of an erosion or, in a few cases, of Nabothian follicles associated with a mucopurulent discharge from the external os.

The diversity of symptoms presented when cervical erosion was the only lesion found became evident. These symptoms have been analysed in 128 cases out of the 870 treated. The remaining cases of erosion have been set aside because they were associated with other conditions which clouded the issue, or because follow-up was impossible. In all other respects these 128 cases are unselected.

The symptoms of which the patients complained, and the numbers cured by healing of the erosion, are presented. The patients were examined six weeks after treatment, and were followed up for a period of from six months to two years, in order to observe the permanency of cure and to eliminate any purely psychological effect of treatment.

The treatment employed was thermo-cauterization of the cervix, using the electric cautery. The results of treatment in the 128 cases are analysed, and, in addition, the complications which occurred after cauterization in the 870 cases treated are reviewed.

Symptomatology

The symptoms observed in the 128 patients (summarized in Table I) were, in order of frequency, as follows.

Leucorrhoea.—As is generally recognized (Young, 1930; and others), the cardinal symptom was leucorrhoea. The discharge was typically not more than moderately profuse, mucoid, and white or yellowish in colour. No fewer than 102 (80%) complained of leucorrhoea, and 92 (90%) of these were cured as a result of treatment. Of the remainder four were found to have persistent or recurrent erosion,

TABLE I.—*Symptoms Present in 128 Cases of Cervical Erosion*

Symptom	No. of Cases	Percentage Incidence	Percentage Cured
Leucorrhoea	102	80	90
Backache	75	59	60
Abdominal pain	75	59	56
Frequency of micturition	32	25	75
Menorrhagia	24	19	67
Pruritus vulvae	15	12	100
Dysmenorrhoea	14	11	71
Dyspareunia	11	9	73
Cervical haemorrhage	11	9	100
Sterility	9	7	33
Sense of pelvic weakness	3	2	67

two had trichomonas vaginitis which had not been present at the time of treatment, and in four cases no abnormal discharge could be found on examination.

Backache.—Of the 75 (59%) patients who complained of backache 45 (60%) were cured by cauterization of the cervix, and were still cured when seen six months to two years later. The backache associated with cervical erosion was typically of a constant aching character and was felt in the lumbo-sacral region. It is not claimed that the majority of cases of backache in women are due to cervical erosion. Barns (1948) has stressed the importance of causes other than lesions of the pelvic viscera. Yet the fact that 60% of the women in this series who had cervical erosion and complained of backache were permanently cured by treatment of the cervix demands careful consideration. This is at variance with the views of many writers such as Fulkerson (1926) and Wilfred Shaw (1948), but Young (1930) states that a low backache is not infrequently associated with cervicitis. It is submitted that cervical erosion can by no means be ignored as a cause of this common symptom.

Abdominal Pain.—Of the 75 (59%) patients who complained of abdominal pain 42 (56%) were permanently cured by cauterization of the cervix. The pain in these 42 cases is thought to have been due to the erosion; it was localized in the right iliac fossa in 11 cases and in the left iliac fossa in 4, and was more generalized in the lower abdomen in 24. The pain was of two types—either dull, aching, and constant, or acute and lancinating. The importance of cervical erosion as a cause of troublesome and sometimes severe abdominal pain must be stressed. In this series 56% of patients with erosion and complaining of abdominal pain were permanently cured by treatment of the cervical lesion. Six patients had already undergone abdominal operations without relief, and were subsequently cured by simple cauterization of the cervix. The following two cases illustrate this point.

Case 1.—A married woman aged 34, with one child aged 7, complained of attacks of pain in the right iliac fossa for one year, and of leucorrhoea. An emergency appendicectomy had been performed four months previously. The removed appendix was normal. The pain continued. On examination she was found to have a cervical erosion, which was cauterized. After six weeks the cervix was healed and the patient was symptom-free. Two years later the cervix was healthy and there was no abdominal pain and no discharge.

Case 2.—A married woman aged 44 complained of dragging lower abdominal pain, with intermittent acute exacerbations, since the birth of her only child 18 years before. Three years after delivery a pelvic floor repair had been carried out, followed two years later by subtotal hysterectomy, appendicectomy, and right oophorectomy. There was no relief from the abdominal pain. On examination a marked chronic cervicitis with an erosion and numerous Nabothian follicles was found. The cervix was cauterized. Six weeks later the cervix had healed and the patient was symptom-free. After one year the pain had not recurred, and the patient felt better than for nearly twenty years.

These facts will be sufficient to emphasize the association of abdominal pain with cervical erosion. It is suggested, therefore, that before any operation is performed on a patient complaining of abdominal pain of no clear origin, and particularly if such pain is associated with a vaginal discharge, the cervix should be examined and cervical erosion excluded.

Frequency of Micturition.—Of the 32 (25%) patients who complained of day-and-night frequency 24 (75%) were cured by cauterization of the cervix, with no other treatment. Unfortunately, microscopical and bacteriological examination of a catheter specimen of urine was carried out in only 16 of the 32 cases: only one showed evidence of infection, the organism being *Bact. coli.* Of the remaining 15 cases of frequency known to be unassociated with infection 14 were cured by cauterization of the cervix. This supports the hypothesis that cervical erosion often causes a trigonitis, in which no organism can be recovered from the urine, and is in agreement with the observations of Vassallo (1936). The one case of infection is of interest, as it illustrates how cervicitis can be an aetiological factor in the production of recurrent cystitis (Winsbury-White, 1933). In the case under review, in which there had been numerous attacks of recurrent cystitis, the condition has remained entirely cured for two years, following a single course of sulphonamide therapy and healing of the cervical erosion.

Menorrhagia.—There were 24 (19%) patients who complained of an excessive menstrual loss—that is, the loss was more than their normal or their periods had become more frequent. No treatment other than cauterization of the cervix was employed, and as a result no fewer than 16 (67%) were cured. Details of these cases in which the periods returned to normal after cauterization are given in Table II. It would appear, therefore, that menorrhagia

TABLE II.—*Details of 16 Cases of Menorrhagia Cured by Cauterization of Cervix*

Age of Patient	Menstrual Cycle in Days		Remarks
	Before Cauterization of Erosion	After Cauterization of Erosion	
33	5–6/21. Profuse loss	3/24–26. Average loss	
35	9–10/28. Profuse loss	6–7/28. Average loss	
27	5/14–20	5/26	
44	7/14	7/28–49	Probably climacteric
22	7/26. Profuse loss	6/26. Average loss	
43	5/14–21. Moderate loss	5/28. Average loss	Child 3½ years
48	7/21. Very profuse	3/21. Average loss	
34	3–10/14–28.	3/28	
25	12/28. Profuse loss	7/28. Average loss	Child 11 months
36	5–6/14–28	5/24–28	
41	7/28. Very profuse loss	7/28. Average loss	
26	5/21. Profuse loss	4/26. Average loss	Child 19 months
24	7/28. Very profuse loss	7/28. Loss much less; now average	
17	7/14. Profuse loss	7/28–34. Average loss	
28	10/21	4/28. Average loss	
30	8/28. Profuse loss	7/28. Average loss	

is in some cases associated with cervical erosion. This fact has been noted also by Young (1930), Ground (1936), and Joubert (1946).

Pruritus Vulvae.—Fifteen patients (12%) complained of pruritus vulvae; no demonstrable cause, other than a cervical erosion, was found. All were cured by cauterization of the cervix. This eliminated the cervical discharge, which was probably the cause of the pruritus. These findings differ from those of Jeffcoate (1949).

Dysmenorrhoea.—Fourteen patients (11%) complained of dysmenorrhoea. Ten (71%) were relieved of the symptom by cauterization of the cervix. The dysmenorrhoea

was of the spasmodic type in nine, six being cured by treatment of the cervix. It was of the congestive type in five, four being cured by cervical cauterization. It seems possible that cauterization may cure spasmodic dysmenorrhoea in some cases by interfering with the sympathetic innervation of the cervix in a manner similar to that following cervical dilatation.

Dyspareunia.—Of the 11 (9%) patients who complained of deep dyspareunia 8 (73%) were cured by cauterization of the cervix. In none of these was the dyspareunia associated with any other obvious clinical cause. It has been noted that, in some cases in which there is cervical erosion, movement of the cervix during vaginal examination causes pain, and it is therefore not surprising that these patients complain of dyspareunia.

Cervical Haemorrhage.—There were 11 (9%) cases of bleeding from the cervix. Seven complained of intermenstrual bleeding and two had a post-coital loss. In addition, two patients complained of post-menopausal bleeding for which curettage of the uterus showed no cause. The bleeding, which was from the "eroded" area of the cervix, was cured in every case by treatment of the cervix.

Sterility.—Nine patients (7%) complained of sterility. Three of these, of whom one was a 1-para and two were nulliparous, conceived six, five, and one month after cauterization respectively. Cervical erosion is a recognized cause of subfertility, and these figures, though small, bear this out.

Sense of Pelvic Weakness.—Three patients, in whom no prolapse was demonstrable, complained of a sense of pelvic weakness simulating prolapse. This was entirely eliminated in two of the cases by cauterization of the cervix.

Comment on Symptomatology

Of the 128 cases of erosion, 19 (15%) were "congenital" in origin—that is, occurred in patients who had never been pregnant. A separate analysis of the symptoms in these 19 cases revealed no noticeable difference in the symptomatology.

In addition, many of the patients complained of general fatigue and listlessness, and experienced an improvement in their general health after the cervix had been treated. Many and varied symptoms not localized to the pelvis have been attributed to cervicitis by some writers (Derow, 1940; and others), and Young (1930) and others stress the role of cervicitis as a focus of infection in the aetiology of systemic disease. No instance was observed in this series.

An attempt to analyse these general symptoms has not been made, but it may be fairly stated that the local symptoms already discussed may in themselves be sufficiently worrying to the patient to make her feel a great deal better when they have been cleared up.

Treatment

Treatment consisted of cauterization of the cervix with the electric thermo-cautery. This was done in the out-patient department, except when the hymen was intact, the erosion was very large, or an anaesthetic was required for some other reason. Cauterization was not carried out during pregnancy, and six weeks were allowed to elapse after delivery before an erosion was cauterized. The technique was to expose the cervix with a speculum and to cauterize the cervical canal as the first step, without preliminary dilatation. The area of the erosion was then cauterized in lines radiating from the external os.

This procedure caused little distress in the majority of cases. It is noteworthy that during the cauterization most patients experienced aching lower-abdominal pain, in many instances similar to that of which they had previously complained.

The patients were instructed to douche twice daily with a dilute "milton" solution and to avoid coitus for six weeks. Each was given a printed slip warning her to expect a temporary worsening of such symptoms as backache, lower abdominal pain, and vaginal discharge, and to be prepared for some bleeding at the time of the separation of the slough, eight to ten days later.

All patients reported after six weeks, and if the cervix had not healed the treatment was repeated.

Results

In 109 cases the cervix was healed six weeks after the first treatment. A further 17 were healed after two treatments, and in one case three treatments were carried out before healing occurred. In the remaining case the cervix failed to heal after being cauterized three times. This cervix was subsequently amputated, but microscopical examination revealed no pathological change other than chronic cervicitis with erosion. Simple cauterization of the cervix therefore resulted in healing in 99.2% of cases.

Recurrence Rate.—When the patients were followed up six months to two years after treatment 6 of the 128 cases (4.7%) were found to have a cervical erosion, with a recurrence of symptoms. These cervices were known to have been healed six weeks after cauterization. None of the patients had been pregnant in the interim. They were therefore cases of recurrent erosion, representing a failure of treatment in 4.7% of cases and necessitating recauterization. This was carried out, and in four of the six cases the cervix was healed six weeks later. The remaining two cases were not followed up.

Complications

The complications which have been described after cauterization of the cervix are haemorrhage, pelvic infection, and atresia or stenosis of the cervical canal (Dell, 1938; Henkin, 1937; and others).

Of the 870 cases of erosion cauterized, six (0.7%) developed complications. There were two cases of haemorrhage, two cases of pelvic infection, and two cases of atresia of the cervical canal. No complications occurred in the 128 cases already analysed above.

Haemorrhage

Only two patients experienced bleeding severe enough for admission to hospital. That it was not serious even in these cases is shown by the fact that in each instance it was readily controlled by rest, sedatives, and hot douches.

Of the 128 cases analysed 47 (37%) experienced bleeding after treatment—in 42 the bleeding was slight, and in 5 it was "like a very profuse period" and the patients had to rest in bed at home for 24 to 48 hours. The occurrence and severity of haemorrhage in these cases bore no relation to the phase of the menstrual cycle in which cauterization had been carried out. This is at variance with the opinion of Maryan (1943).

Pelvic Infection

There was one case of pelvic cellulitis and one case of an acute exacerbation of a chronic salpingitis following cauterization. The two case histories are given below.

Case 3.—A nullipara aged 32 complained of constant lower-abdominal pain and of leucorrhoea for one year. There was

no history suggestive of abortion or salpingitis; the appendix had been removed. On examination the only gynaecological abnormality found was a cervical erosion. This was cauterized. Five weeks later the patient came to hospital complaining of increasing lower-abdominal pain since the cauterization, and of feeling "ill and feverish." She was flushed, her temperature was 99.8° F. (37.7° C.), and her pulse rate 96 a minute. There was tenderness but little guarding in the right lower abdomen. On vaginal examination the cervix was found to be healed. A tender, firm, ill-defined mass was palpable in the right fornix. On rectal examination the right utero-sacral ligament was found to be indurated, thickened, and very tender. A diagnosis of pelvic cellulitis was made. A five-day course of penicillin and sulphatriad, followed by short-wave pelvic diathermy, was given. The temperature and the pain subsided rapidly, though the induration in the right utero-sacral ligament persisted for some weeks. Three months later the patient was symptom-free and no sign of the cellulitis remained.

Case 4.—A 5-para aged 36 complained of a dragging pain in the left iliac fossa and of a profuse yellow vaginal discharge for eight years, since the birth of her last child. She also had menorrhagia. She was said to have had an attack of acute salpingitis two weeks before. On examination her general condition was satisfactory. Pelvic examination revealed an enlarged and tender left tube and a cervical erosion. The erosion was cauterized. A week later she complained of severe pain in the left iliac fossa and a profuse blood-stained discharge. Her temperature was 101° F. (38.3° C.). The lower abdomen was tender, particularly in the left iliac fossa. Vaginal examination revealed an acutely tender swelling, with pulsation, in the left fornix. Acute salpingitis was diagnosed and a course of penicillin and sulphatriad was begun. Next day her condition had deteriorated, and laparotomy was performed. The peritoneal cavity contained thin offensive pus, from which anaerobic streptococci were later isolated. A small necrotic left pyosalpinx was found, surrounded by adhesions. The abdomen was closed, with drainage. Convalescence was stormy for two weeks, but the patient made a satisfactory recovery.

This danger of an acute exacerbation of a chronic salpingitis after cauterization of the cervix has been pointed out by Cannell and Douglass (1935), Dell (1938), and others and is again emphasized.

Stenosis

Two cases of haematometrium occurred; these were caused by occlusion of the external os by scar tissue.

Case 5.—A 2-para aged 36 complained of abdominal pain and discomfort, and of amenorrhoea, since cauterization of the cervix in the out-patient department ten weeks before. On examination under anaesthesia the external os was found to be occluded by a thin layer of fibrous tissue, and after the passage of a sound a small quantity of dark-red blood escaped. The patient subsequently remained well.

Case 6.—A 2-para aged 56 complained of post-menopausal bleeding and of soreness of the vulva. On examination a mild degree of prolapse, kraurosis vulvae, and a cervical erosion was found. In December, 1948, dilatation and curettage, biopsy of the cervix, and cauterization of the cervical erosion were carried out under general anaesthesia. The subsequent histological examination of the curettings showed no malignant change in the endometrium, and biopsy of the cervix confirmed the diagnosis of cervicitis with erosion. Ethinyl oestradiol was prescribed on account of the kraurosis vulvae. In February, 1949, there was no further bleeding and the patient was symptom-free.

In June, 1949, six months after cauterization, she complained of lower-abdominal discomfort and of a sense of pelvic weakness. On bimanual examination the uterus was found to be bulky. When the cervix was drawn down to test the degree of uterine prolapse an adhesion over the external os gave way and a large quantity of dark-red blood escaped from the cavity of the uterus. Subsequently a vaginal hysterectomy with pelvic repair was performed on account of the concealed post-menopausal bleeding associated with prolapse. No evidence of malignancy was found in sections prepared from the uterus. The patient made an uneventful recovery.

First-stage dystocia is said to result occasionally from rigidity of the cervix due to scarring after extensive cauterization. Seven patients in the series of 128 cases were confined from 10 to 17 months after cauterization, and each had a normal first stage of labour. There is therefore no evidence in this series of dystocia following cauterization of the cervix.

Conclusions

Cervical erosion is a common and incapacitating lesion, and its clinical manifestations are not sufficiently recognized. This lack of appreciation of the symptoms of cervical erosion leads to the failure to look for, find, and treat the cause of many gynaecological complaints, thus in many instances condemning the patients to chronic ill-health as a result of such symptoms as leucorrhoea, backache, abdominal pain, and dysuria.

Worse still is the case of the patient who is subjected to some unnecessary operation on a mistaken diagnosis, when abdominal pain is the presenting symptom and the presence of a cervical erosion is overlooked.

The teaching so commonly heard that pain felt in the lower abdomen in one or other iliac fossa is ovarian in origin is, in my submission, unsound. Much more often such pain is due to cervical erosion, and the cervix should be inspected in such cases. Indeed, it should be inspected in all cases presenting the symptoms which have been discussed.

The treatment of cervical erosion by cauterization of the cervix in the out-patient department, without anaesthesia and without preliminary dilatation of the cervix. was in most cases found to be very satisfactory. Of 128 cases treated by cauterization, 99.2% were cured, with a recurrence rate of only 4.7%.

Serious complications after this treatment were few, and occurred in only 0.7% of a series of 870 cases. Although mild secondary haemorrhage from the cauterized area was relatively common, it was exceptional for the bleeding to be severe enough to necessitate the admission of the patient to hospital. Haematometrium and pelvic cellulitis may occasionally occur. In my opinion, if the cervix is cauterized in the presence of chronic pelvic infection, such as a chronic salpingitis, there is a very considerable risk of a severe acute exacerbation.

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GASTRIC ULCER OCCURRING AFTER VAGOTOMY

BY

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Increasing experience of the late results of vagotomy for duodenal ulcer has shown that the percentage of patients thus treated who are not relieved of their ulcer distress may be as high as 25% (Orr and Johnson, 1949) even though there is a satisfactory reduction in the free gastric acid level. Other authors, reviewing their results after shorter periods, report more favourable figures (Moore, 1947, 1948 ; Cameron *et al.*, 1949 ; Healy and Sauer, 1949). Search of the literature for the causes of unfavourable results has revealed only two records of the occurrence of gastric ulceration after successful vagotomy for duodenal ulcer. Orr and Johnson (1949) report one such case in their series of 71 cases, and Dragstedt *et al.* (1949) record two examples of this complication in their series of 197 cases of duodenal ulcer treated by vagotomy alone.

The complication is therefore rare, but is important because of the malignant potentiality of gastric ulcers and because such ulcers are sometimes remarkably painless after vagotomy (Kugel and Janzen, 1949). For this reason it is felt that the following two case reports will be of interest, as they provide further evidence of the inefficacy of vagal section in interrupting the normal course of simple gastric ulceration. These cases come from a series of 79 cases of duodenal ulcer treated by vagotomy alone at the Queen Elizabeth Hospital, Birmingham. Over fourteen months have elapsed since the most recent of these cases was operated upon, and every case has been followed up at six- and twelve-monthly intervals with barium-meal examinations and an insulin test.

Case 1

A wood machinist aged 40 was seen in the out-patient department in March, 1948, complaining of symptoms of duodenal ulcer of 13 years' duration. From 1935 to 1938 his periods of pain lasted approximately one week, with intervals of freedom up to three months. From 1939 onwards his symptoms were more persistent and were associated with vomiting. Barium-meal examination in 1944 revealed a duodenal ulcer, and from that time he followed a careful dietary regime which controlled his symptoms so that he was able to continue at work. During May, 1946, the ulcer perforated. After operation he was symptom-free for seven months. From January, 1947, his symptoms were more or less continuous. There was no haematemesis or melaena.

Examination revealed a well-built man, weighing 142 lb. (64.4 kg.) and 5 ft. 9 in. (175 cm.) in height, with an abdominal scar from his previous operation. Except for tenderness on palpation of the epigastrium, physical examination revealed no further abnormality. The relevant points from his laboratory investigations and *x*-ray examination were as follows:

Barium meal and screening: duodenal deformity present; stomach emptying in four hours. Radiograph of chest was normal. Blood count: red cells, 5–6 millions per c.mm.; Hb, 15.7 g.%; C.I., 1.01; white cells, 5,700 per c.mm. A fractional test meal revealed the following: fasting juice 29 ml.; no mucus in any specimen; bile in the 2¼-hour specimen; maximum acidity in 1¼-hour specimen (0.22 g. of free HCl per 100 ml.); residual juice 2 ml. The histamine test showed maximum acidity in a 30-minute specimen (0.42 g. of free HCl per 100 ml.). The night fasting gastric secretion (maximum acidity 0.43 g. of free HCl per 100 ml.) and the insulin test are graphically presented in Fig. 1.

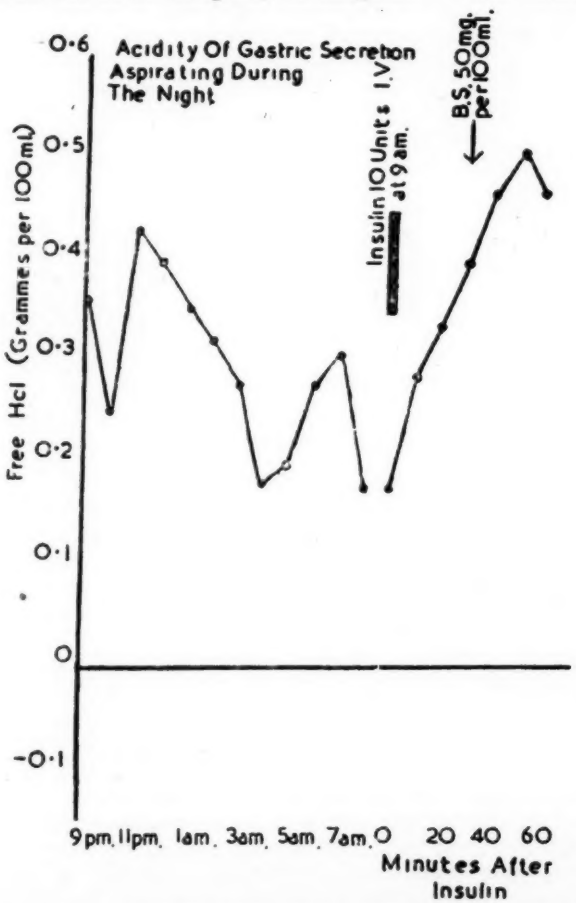

FIG. 1.—Case 1 (April 10, 1948). Night gastric secretion and insulin test before vagotomy.

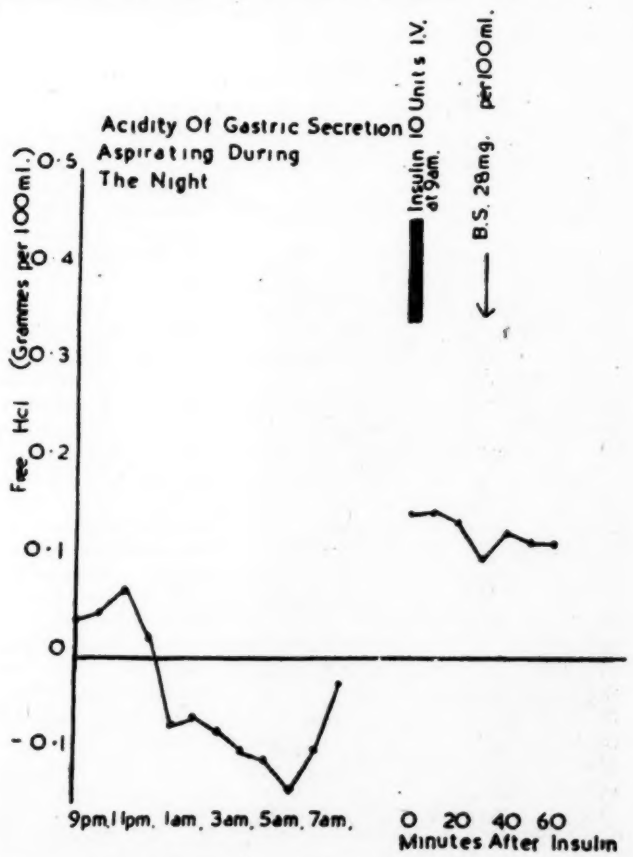

FIG. 2.—Case 1 (October 11, 1948). Night gastric secretion and insulin test six months after vagotomy.

On consideration of these findings the case was thought suitable for treatment by vagotomy, but it was felt that, even though there was no evidence of pyloric narrowing, the site of the previous perforation should be inspected.

On April 15, 1948, under general anaesthesia, the left side of the chest was opened after excision of a segment of the eighth rib. Through a 4-in. (10-cm.) incision in the diaphragm, forward from the region of the oesophageal hiatus, the stomach was carefully inspected and the patency of the pyloric canal and duodenum confirmed by palpation. A duodenal ulcer was present, but there was no evidence of gastric ulcer. The diaphragmatic incision was closed and vagal section carried out in the usual manner with resection of 2-in. (5-cm.) segments of the nerves.

Convalescence was uneventful, the patient being discharged on the 11th day. His weight on leaving hospital was 138 lb. (62.6 kg.). By the third month following his operation he was perfectly well, had resumed work, and had gained 14 lb. (6.4 kg.) in weight to 152 lb. (68.9 kg.). On October 1 he complained of epigastric pain after food, relieved by vomiting, and volunteered the information that these fresh symptoms were quite unlike his previous ones. He began to lose weight, and when readmitted to hospital on October 15 he weighed 136 lb. (61.7 kg.). The insulin test was repeated (Fig. 2), and barium-meal examination now showed a gastric ulcer about the middle of the lesser curve, with no delay in stomach-emptying. The duodenal cap was deformed but not tender. His symptoms were not controlled by diet and alkalis, and four weeks later a partial gastrectomy was performed.

At operation the gastric ulcer was readily identified about midway along the lesser curve, as was the scar of the old duodenal ulcer, which appeared to be healed. Examination of the stomach afterwards showed a peptic ulcer about ½ in. (1.2 cm.) in diameter, with yellow necrotic base, penetrating deeply into the stomach wall. Histological section revealed a complete breach of muscular coat and replacement by fibrous tissue without evidence of malignancy. The patient's convalescence was again satisfactory, and he remained symptom-free 21 months later.

Case 2

A man aged 45 had had epigastric pain after meals for 12 years, with periods of freedom from symptoms up to two months. He had been treated by six weeks' rest in bed and dietary measures on two occasions, but pain recurred on resuming full work. There had been no haematemesis or melaena. Examination showed a well-nourished man of 5 ft. 7 in. (170 cm.) in height, weighing 129 lb. (58.5 kg.). Physical examination was entirely negative.

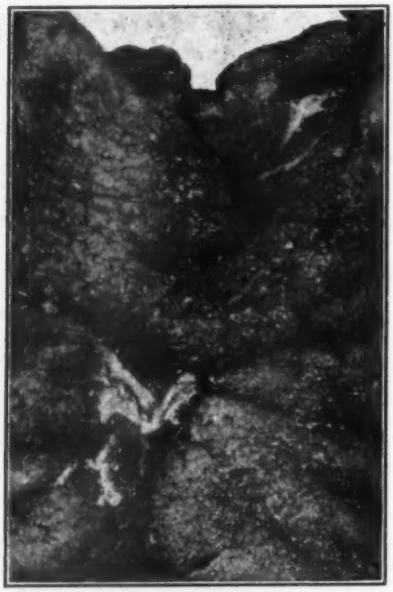

FIG. 3.—Case 2. Photograph of stomach showing two gastric ulcers.

Fractional test meal: "high normal" acid curve with a large volume of resting juice (194 ml.) containing charcoal. Blood count: red cells, 5,090,000 per c.mm.; Hb, 14.1 g.%. A barium meal showed deformity of the duodenal cap, thought to be due to chronic ulceration.

On February 11, 1949, laparotomy was carried out by Mr. B. N. Brooke. A chronic duodenal ulcer was seen on the anterior wall of the first part of the duodenum with some scarring, but no appreciable stenosis and no evidence of gastric ulcer. In view of this he considered that vagal section was justifiable, and this was effected below the diaphragm.

The patient's immediate convalescence was uneventful, and he was discharged from hospital 12 days later. Three months after the operation he was still symptom-free, had gained 17 lb. (7.7 kg.) in weight, and had resumed his normal occupation of grocer. He was enthusiastic about his progress and was now able to eat a variety of foods which he had not been able to do for many years. He was seen again on July 13, 1949, when he complained of foul eructations and occasional attacks of diarrhoea, but no postprandial pain or discomfort. On August 25 he had a sudden severe haematemesis (he alleged that he vomited about three pints (1.7 litres) of blood-stained fluid), followed by repeated tarry stools.

On admission to hospital next day his red blood cells numbered 2,300,000 per c.mm. and haemoglobin was 44%. He was given a slow transfusion of two pints (1.14 litres) of blood, and after a temporary rise his blood count and haemoglobin began to drop steadily. The stools still contained altered blood on the tenth day after admission. In view of the continued bleeding a further transfusion was given and a partial gastrectomy was performed on September 6 by Mr. Brooke. On this occasion the old duodenal ulcer appeared to have healed, but there were now two small but deep gastric erosions about 3 in. (7.5 cm.) from the pylorus on the lesser curvature. Histological examination of the ulcers revealed a complete breach of the muscle coat and fibrous tissue formation at their bases (Fig. 3). The patient's convalescence was again uneventful. He was discharged from hospital 12 days after operation with a blood count of 4,900,000 red cells per c.mm. and 98% haemoglobin. He has remained symptom-free up to the present time (July, 1950).

Comment on the Cases

Post-operative insulin test results are not available in Case 2, as the patient was admitted to hospital with haematemesis within the six-months period, but the direct evidence of healing of his duodenal ulcer with the entire relief of symptoms while on a full mixed diet probably indicates that complete vagal section was achieved. The result of the insulin test six-months post-operatively in Case 1 is considered to be compatible with complete vagal section, as there was no rise of the acid level following an induced hypoglycaemia of 28 mg. per 100 ml. The view that the gastric ulcer developed after the vagotomy is based on the *x*-ray evidence and examination at the time of operation, which of necessity, by reason of the approach used, involved manual retraction of the lesser curve.

Discussion

The addition of these two cases to those already reported gives an incidence of 5 in 347 cases of complete vagotomy for duodenal ulcer. Many of the other causes of unfavourable results, such as recurrence and non-healing of the duodenal ulcer, may be explained on the grounds of incomplete nerve section, but such tests as we possess—the insulin test, lowering of gastric acidity, clinical and radiological healing of the original ulcer—indicate that in these cases the vagal section was complete. Dragstedt thought that gastric stasis may have been a causal factor, as he has not had this complication in any of 262 cases of duodenal ulcer treated by vagotomy and gastroenterostomy; and Orr and Johnson found gastric retention in their case, which also presented with painless haematemesis. There was evidence of gastric retention in my Case 2, but barium-meal examination of Case 1 at the time of onset of ulcer symptoms did not reveal any delay in gastric emptying.

It is difficult to reconcile the occurrence of gastric ulcer after successful vagotomy with current views on the pathogenesis of the condition. There is after vagotomy a lowering of the gastric acid level and particularly of the volume and degree of acidity of the night acid secretion. This problem might be solved if an unequivocal test of complete vagal section were available; and the observations of Brooke (1949) with regard to the insulin test are supported by the findings of Walters and Brownson (1948) and Walters *et al.* (1949) that in their series the clinical results in those cases showing a negative post-operative insulin test were similar to those showing a positive response. Without therefore being able to say that vagotomy has any causal relationship to the gastric ulcers in the cases described above, it does seem that the lowering of acidity brought about by vagal section affords no protection against ulceration developing. Further confirmation is forthcoming from the report of Nuboer (1949), who has described the occurrence of gastric ulceration in some of his cases following resection of the oesophagus for malignant disease, when the vagi were necessarily completely divided.

These two cases are obvious failures following vagotomy in the treatment of duodenal ulcer. The Birmingham series referred to above contains cases which have had other undesirable sequelae of the operation: these will be recorded when the series is fully analysed.

Summary

In a series of 79 cases of duodenal ulcer, two cases developed gastric ulcer following successful vagal section. These two cases are described.

The view is expressed that vagotomy is unsuitable as a treatment of gastric ulceration and confers no protection against the development of a gastric ulcer.

In both cases the gastric ulcers developed within six months of the vagal section.

I am indebted to Mr. B. N. Brooke for permission to publish Case 2, and to Professor F. A. R. Stammers for his guidance and help in the preparation of this paper.

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According to a press report the New York Academy of Medicine has arranged a series of "refresher" lectures for doctors in New York which will be given over the radio. Believed to be the first of its kind, the series is designed to bring the latest scientific developments in medicine to doctors who are unable to attend medical conventions, who have no hospital connexions, or who are too busy to read through the medical journals. The one-hour programmes, to be broadcast every Thursday evening, will actually be transcriptions of papers delivered at the Academy's regular Friday afternoon lectures. A test broadcast last April on A.C.T.H. and cortisone received such wide response that planning went ahead for the series. The New York radio authorities are now planning to start a similar series of "refresher" lectures for lawyers and are hoping to expand the idea to other professions.

EPIDEMIC OF BENIGN DRY PLEURISY

BY

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Since Sylvest's original monograph on Bornholm disease, or epidemic myalgia, was published in 1933, a similar condition has been described in countries as widely separated as Scandinavia, India, and the United States. A diagnosis of benign dry pleurisy has been made in cases with associated pleural friction.

In this country epidemics have been sporadic in appearance and often confined to localized communities such as schools (Attlee *et al.*, 1924; Carter, 1933), children's hospitals and convalescent homes (Lloyd, 1924; Williamson, 1924), or to single households (Howard, 1938), while Pickles (1933, 1939, 1948) has described several outbreaks in village communities in Yorkshire.

Scadding (1946) reviewed the literature on Bornholm disease and described a series of similar cases observed among soldiers in the Middle East. These were characterized by a high incidence of pleural friction (55% of 20 cases), and he consequently named them benign dry pleurisy.

This paper records an epidemic of benign dry pleurisy occurring in two households in the Bayswater district of London during September and October, 1949. Eleven cases in all were encountered, two of which were observed during the course of their illnesses.

Case 4

A healthy medical student aged 22 became ill on October 4: he complained of severe pain in both upper quadrants of the abdomen, which was lancinating and worse on coughing or deep breathing. It radiated first to the right, then to the left shoulder, and was accompanied by headache and sweating.

When first seen on October 5 his breathing was shallow and painful and his temperature 100.8° F. (38.2° C.), but, apart from upper abdominal tenderness, there were no abnormal physical signs. In view of the position and radiation of the pain, the absence of cough or abdominal rigidity, and his clean tongue, a tentative diagnosis of diaphragmatic pleurisy was made.

On October 6 his temperature had risen to 101° F. (38.3° C.) and his respirations were 40 a minute. The pain and tenderness were now localized in the region of the left costal margin. A chest radiograph showed no abnormality at the left base; there was, however, a slight but definite decrease in translucency at the right base, together with slight elevation of the right half of the diaphragm. The total leucocytes were 8,000—polymorphs 6,000 (75%), lymphocytes 1,600 (20%), monocytes 400 (5%).

On October 7 there was a pleural rub in the right axilla which persisted for three days. His E.S.R. (Westergren) was 18 mm. in one hour and the Mantoux reaction was positive to 1 in 1,000 tuberculin. The diaphragm moved normally on screening. Recovery was rapid; by October 11 he was free of symptoms and there was no relapse. A radiograph of the chest taken on November 16 showed no residual shadowing.

Case 10

On October 22, eighteen days after the above patient had fallen ill, a second medical student, aged 26, was seized with pleuritic pain in the right shoulder which wakened him in the night and which spread to the right upper abdomen when he got out of bed. The pain was worse on lying down and prevented him from lying on the affected side. His temperature was 99° F. (37.2° C.) and there were no abnormal physical signs. On October 23 the pain had spread to the left shoulder and

right lower chest, there was right upper abdominal tenderness, and a pleural rub which persisted for twenty-four hours was heard below the right nipple. By the 24th he was free of symptoms. The total leucocyte count was 7,000—polymorphs 4,340 (62%), eosinophils 770 (11%), basophils 70 (1%), lymphocytes 1,540 (22%), monocytes 280 (4%). The E.S.R. (Westergren) was 4 mm./hour. A chest radiograph, however, was normal.

The second patient stated that other residents at his lodgings had also suffered from similar symptoms. When they were interviewed it was evident from the typical history given in nine cases that there had been an epidemic of benign dry pleurisy similar to that described by Scadding (1946).

All the cases occurred in two lodging-houses under common ownership in adjacent streets in Bayswater. The patients were healthy adults between the ages of 19 and 28, in the proportion of nine males to two females. The onset of the epidemic was dated to September 28, when, in House A, the manageress, aged 24, wakened with pain under both costal margins. Four days later (October 2) her sister, living in House B, fell ill with similar symptoms. Seven further cases were identified in House A and two in House B. They are listed in Table I.

TABLE I

House A (16 Residents)				House B (20 Residents)			
Case No.	Age	Date of Onset	Occupation	Case No.	Age	Date of Onset	Occupation
1	24	Sept. 28	Manageress	2	19	Oct. 2	Music student
3	22	Oct. 3	Medical student	4	22	,, 4	Medical student
5	24	,, 5	Pharmacist	6	26	,, 6	Art student
7	21	,, 9	Medical student				
8	28	,, 19	Student				
9	21	,, 21	Medical student				
10	26	,, 22	,, ,,				
11	20	,, 24	,, ,,				

Summary of the Eleven Cases

Prodromal Symptoms.—One case only had catarrh preceding the attack of pain; there were no cases with sore throat (as have been reported by Attlee *et al.*, 1924). The onset was sudden in all cases, with pain as the presenting symptom. The pain was always suggestive of pleurisy and was worse on lying down. Unlike the pain of pleurisy associated with pneumonia or tuberculosis, it was worse when lying on the affected side, possibly because immobility of the intercostals in this position caused increased movement of the diaphragm. The situation of the pain at onset was right-sided in 9 of the 11 cases, and is set down in Table II. The position of the pain and its reference to

TABLE II.—*Situation of Pain at Onset*

	No. of Cases
Right shoulder	3
Upper abdomen	3
Under right costal margin	2
In right arm and under right costal margin	1
In right chest and right shoulder	3

the shoulders suggests its origin in the diaphragm, and it is interesting that in Case 7, whose pain was in the right subcostal region, referred pain in the right shoulder was produced by pressure below the right ribs.

The average length of illness was three to four days, the minimum being two and the maximum seven days, and no relapses occurred. Pleural friction was heard in the two cases seen during the illness. It was of short duration and unilateral in both cases.

Radiographic and Blood Examinations.—Leucocyte counts were normal in both cases treated in hospital; the E.S.R. was normal in Case 10 (4 mm./hour) and raised in Case 4 (18 mm./hour). In previous series, chest radiographs have been normal and the diaphragm has moved normally on screening. In one of the two cases radiographed in the present epidemic abnormal findings were present. On the second day of illness Case 4 had a slight but definite decrease in translucency at the right base, which was more marked on the fourth day and was associated with slight elevation of the right half of the diaphragm. These *x*-ray changes were minimal but definite, and were possibly caused by pleural oedema.

Differential Diagnosis.—Finn (1947), in Boston, writing of a large series of cases, reports confusion with pneumonia, glandular fever, influenza, "non-paralytic poliomyelitis," lymphocytic chorio-meningitis, hepatitis, and acute abdominal emergencies. Pickles (1933) has emphasized that faulty diagnosis from the acute abdomen may lead to needless laparotomy. The pleural friction heard in the two cases here described clearly indicated the source of the pain.

Complications.—Pericarditis and orchitis have been quoted by Finn *et al.* (1949) in Boston and by Jamieson and Prinsley (1947) in Aden, while McConnell (1945), in Pennsylvania, recorded a high incidence of neurological symptoms (68% of 16 cases). There were no complications in this series.

Epidemiological Aspects

Seasonal Incidence.—The disease seems to be most prevalent in the summer and early autumn, when these cases occurred, resembling poliomyelitis in this respect. It is of interest that three cases of paralytic poliomyelitis and one of polio-encephalitis occurred among the hospital staff during the same period as the cases of epidemic pleurisy.

The incubation period is quoted by Finn (1947) as 8–10 days. In this epidemic it would appear to lie between 2 and 19 days. The cases occurred in two groups at intervals of ten days, the first group including occupants of both houses.

Case 2 may have been infected from her sister (Case 1), or both may have derived their infection from a common unidentified source. If Case 4 was infected from one of the preceding cases this could only have been from Case 2, making the minimum incubation period two days. The longest possible incubation period in these cases is provided by Case 11, who returned from holiday on October 5 and developed symptoms on the 24th (19 days).

The second group, Cases 8 to 11, consists of students who returned to London from holiday on October 5. Two of them, Cases 10 and 11, returned to share adjacent rooms with Cases 3 and 7 respectively, Case 3 being in bed with the disease at the time. Their accommodation on and after October 5 is shown in Table III.

TABLE III.—*Occupants of Adjacent Rooms in House A on October 5*

	Case	Onset of Symptoms
Room 1	3	October 3
	10	,, 22
Room 2	7	,, 9
	11	,, 24

Cases 10 and 11 returned from holiday on October 5. Prior to October 5, Room 1 was occupied by Cases 3 and 7, Room 2 being let to temporary visitors.

Causative Agent

Attempts to isolate any infective agent have met with little success. Small (1924) suggested a plasmodium; other workers have failed to isolate any bacteriological agent; nor has any virus been isolated from stools or nasal

washings. Henle (quoted by Finn *et al.*, 1949), in complement-fixation tests for the viruses of influenza and choriomeningitis, had negative results.

The absence of any other infective agent and the nature of the outbreaks suggest a virus as the probable cause. In the present series complement-fixation tests for the Coxsackie 2 strain of virus were kindly performed by Dr. G. M. Findlay in March, 1950 (five months after the last recorded case). Sera from five cases were tested, and the results are listed in Table IV. Three cases were strongly positive and two faintly positive; two normal students taken as controls were negative.

TABLE IV.—*Result of Complement-fixation Tests*

Serum	Antigen		
	Coxsackie 1	Coxsackie 2	Normal Mouse
Case 4	—	+ 1 in 5	—
Case 7	—	+ 1 in 20	—
Case 9	—	+ 1 in 20	—
Case 10	—	+ 1 in 20	—
Case 11	—	+ 1 in 5	—
Control I	—	—	—
Control II	—	—	—

This virus, which is transmissible only through newborn mice, was originally isolated by Dalldorf and Sickles (1948) and later by Melnick *et al.* (1949) from the faeces of cases of "non-paralytic poliomyelitis" in the United States. In mice the infection involves skeletal muscles, producing severe myositis and paralysis, while the central nervous system is unaffected. Death commonly occurs within twenty-four hours of the onset of paralysis.

Transmission

The exact mode of transmission is unknown. Melnick *et al.* (1949) isolated the Coxsackie strains from sewage and from flies in areas where epidemics of "non-paralytic poliomyelitis" occurred.

It is interesting that the first case in the present series was the cook for the whole of House A, in which seven further cases occurred, and that Case 2, the first in House B, assisted her parents in preparing food for this household. While this strongly suggests an alimentary spread at the onset of the epidemic, later cases may have arisen from droplet infection owing to the close proximity of their living quarters. On inquiry, however, no cases could be traced outside the two households among their day-to-day contacts at work.

Coincident with the epidemic, one sporadic case was also seen during the illness. A transitory bilateral pleural rub was present and the complement-fixation reaction to the Coxsackie 2 strain was strongly positive (1 in 20). This case also had a minimal unilateral pleuritic reaction on *x*-ray examination which did not persist.

Summary

An explosive outbreak of benign dry pleurisy is reported in two near-by households under common ownership. Two cases are described in detail.

The epidemiological aspects of the outbreak are discussed.

Five months after the illness the sera from five cases were shown by Dr. G. M. Findlay to give positive complement-fixation reactions to the Coxsackie 2 strain of virus as compared with negative results in two normal controls.

It is suggested that, in view of the seasonal incidence and the possible relationship to "non-paralytic poliomyelitis," the mode of spread may be similar to that of poliomyelitis itself and is possibly alimentary.

I wish to thank Dr. G. M. Findlay for his advice and for performing the serological tests, and Professor R. Cruickshank and Dr. T. A. Kemp, physician in charge of the Student Health Service, St. Mary's Hospital, for their guidance and helpful criticism.

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ADRENAL INSUFFICIENCY AFTER SURAMIN TREATMENT OF PEMPHIGUS

BY

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[WITH SPECIAL PLATE]

Suramin ("germanin") has been used for the treatment of pemphigus since 1931. It is a carbamide of a complex salt of trisulphonic acid, is also known as "naphuride" and "Bayer 205," and was originally introduced for the treatment of trypanosomiasis. It is known to have toxic effects on the renal tubules and haemopoietic system. Wells *et al.* (1937) have shown that when given to guinea-pigs in amounts comparable with human doses it causes damage to the renal tubules and adrenal cortex, but the full picture of so-called adrenal atrophy was not achieved in their experiments. Two cases of acute adrenal insufficiency following suramin treatment have been reported (Wells *et al.*, 1937; Tomlinson and Cameron, 1938), but any conclusion that these adrenal changes were solely due to the drug is confused by the fact that many of the features of pemphigus, especially in acute cases, strongly resemble those of adrenal insufficiency and are sometimes improved by the administration of cortical extracts.

Furthermore, Goldzieher (1945) has shown that signs of severe organic damage may be found in the adrenal cortex in deaths from pemphigus. None of the six cases he studied had received suramin,* and he regarded their lesions as terminal secondary processes such as occur in other severe debilitating diseases.

The paradox is a familiar pharmaceutical one—that a drug which mimics the effects of a disease should be beneficial for it—and perhaps the problem is one of correct dosage for the individual.

Wells *et al.* state that none of the persons who have been followed up for some time after suramin therapy for trypanosomiasis have shown any delayed symptoms attributable to adrenal insufficiency. We are therefore in somewhat

*Personal communication.

the same position as we once were with agranulocytosis and sulphonamide therapy. From consideration of only a few cases it is hard to be certain whether the disease or the drug plays the dominant part in producing the lesion. It seems to us likely that in the case of suramin it is a summation effect. We think that this further experience with suramin should therefore be reported. No further comment is necessary.

Case Report

A 37-year-old woman of Scottish-Canadian ancestry was perfectly well until seven months before death, when, in the second month of pregnancy, she developed typical lesions of pemphigus. During the next four months two courses of suramin were started but were stopped after one injection (0.25 g.) because of the development of fever. Three months before death she was delivered of a normal seven-months male infant by elective caesarean section and two weeks later developed rapid mood swings, hallucinations, and delusions, and was admitted to hospital.

Examination revealed a dehydrated, confused, belligerent, agitated, and hallucinated woman whose skin was covered with lesions in all stages of healing, varying from patches of erythema to bullae measuring 2 in. (5 cm.) in diameter. Her temperature varied from 99 to 100° F. (37.2 to 37.8° C.). Her blood pressure was 108/60. The haemoglobin was 70% and the leucocytes numbered 16,000 per c.mm. The urine contained many white cells but no albumin, and cultured *Bact. coli*. Her N.P.N. was 27 mg. per 100 ml.

She was treated with electric shock, and a third course of suramin was completed five weeks before death (1 g. every two days for ten doses), with definite improvement in her mental condition and her skin lesions. No albumin appeared in the urine immediately after the course of suramin. Because of a falling haemoglobin 500 ml. of whole blood was given. At this time she developed an upper respiratory infection which persisted. Two weeks before death abnormal pigmentation of her skin and buccal mucous membrane was noticed, and over a period of a few days she developed anorexia, nausea, and vomiting, and her temperature rose suddenly to 104° F. (40° C.), her pulse to 130, her respirations to 30, and her blood pressure fell to 60/46. Her urine now contained 1+ albumin and her blood chlorides were 489 mg. per 100 ml.

Because of the signs of adrenal insufficiency 10 ml. of "cortin" was given every four hours, at first intravenously and then intramuscularly, together with a continuous intravenous infusion of 5% glucose in normal saline and 100,000 units of penicillin intramuscularly twice a day. The nausea and vomiting decreased, her blood pressure remained around 90/50, and her temperature varied from 99 to 100° F. with occasional elevations up to 102° F. (38.9° C.). Her serum chloride level remained around 540 mg. per 100 ml.

Five days before death her temperature rose to 105° F. (40.6° C.) and then fell to normal, and, though her blood pressure was 100/50 and she appeared to be getting no worse, she died suddenly in the middle of the night.

Necropsy Findings

At necropsy typical Addisonian pigmentation of the buccal mucous membrane and skin was found, and large branny brown macules were scattered over the trunk and extremities.

The heart was soft and flabby; the spleen (470 g.) and liver (2,200 g.) were enlarged and both were congested. Several of the abdominal lymph nodes were enlarged and firm. The adrenals were thin, weighed 10 g. combined, and on cut section all laminae were narrow. The lipoid zone was even and contained lipoid which varied slightly in brightness. It was separated from the grey medulla by a vivid, sharply demarcated reddish black stripe which was much darker than the usual pigment zone.

There was moderate oedema of the brain (1,420 g.), with some herniation of the hippocampal unci and cerebellar tonsils, and moderate compression of the ventricles. All other organs appeared normal.

Microscopical Examination

Fragmentation of the myocardium, congestion of the liver and spleen, and oedema of the abdominal lymph nodes were found, but nothing else of importance except in the adrenals and thyroid.

Adrenals.—Sections of each adrenal were alike. The capsule and its blood vessels appeared normal. The most obvious change was a band of extreme congestion and haemorrhage occupying the inner half of the cortex (Plate, Fig. 1). In it could be seen isolated ghosts of pigmented cells. Peripherally there were radial bars of dilated sinusoids traversing the rest of the cortex, but the capillaries of the medulla were only slightly dilated and then only at the line of junction with the cortex. Because of the variable arrangement of the laminae in the centre of the adrenal it was difficult to be certain that none of the medullary cells were necrotic; most of them showed no evidence of it but were rather widely separated by oedema. In the outer half of the cortex the sinusoids could be recognized, and the spaces between were occupied by vacuoles separated by thin wisps of cytoplasm. Sometimes one could be certain that these vacuoles were in cells and sometimes it was difficult to be sure. At rare intervals there were cells without lipoid occurring singly and in clumps, and many of these showed an acute autolytic form of necrosis and the adjoining sinusoids were enormously dilated (Fig. 2). In frozen sections the vacuoles were found to contain abundant lipoid, most of which was doubly refractile. In summary, there was complete necrosis of the zona reticularis, and vacuolar degeneration and patchy necrosis of the remainder of the cortex.

Thyroid.—The thyroid acini were small, lined by flattened epithelium, and contained little but rather darkly staining colloid. There were many bands in which the acini had atrophied and had been replaced by lymphoid tissue.

Summary

A case is reported of a woman of 37 who developed pemphigus in pregnancy and died of acute adrenal necrosis five weeks after finishing a course of suramin therapy.

We would like to thank Dr. W. Garbe for permission to publish this case.

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A professional conference organized by the Royal College of Nursing and attended by some hundreds of nurses was held in London on June 28 to discuss the educational scope and potentialities of the Nurses Act, 1949. Miss Ethel Strudwick presided, and the principal address was given by Miss Enid Russell Smith, Under Secretary, Ministry of Health. Miss Russell Smith said that the Act provided for the first time for the financing of nurse training separately from the finances of the hospital. It ensured that the money for such training would not be diverted to any other object. The General Nursing Council had been reconstituted and strengthened, educationally and financially, to enable it to carry out its new function. There had previously been a two-tier system, consisting of the General Nursing Council and some 600 training schools; this was bound to be inflexible. Under the Act there would be an intermediate tier of 14 area management committees, each with responsibility for about 40 training schools. Miss Joan B. Price, sister-tutor at the Sheffield Hospitals School of Nursing, said that this school was an educational establishment for four hospitals with 1,200 beds, meeting the educational needs of 500 to 600 nurses. It was financially and administratively independent of the group of hospitals with which it was associated. The teaching staff were appointed by the school itself. There was a most valuable connexion with the medical faculty of the university. Student nurses attended the university and used the lecture theatre, and university lecturers visited the school.

THE INDICATIONS FOR GLOBIN INSULIN

BY

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When globin insulin was introduced over six years ago it was hoped that a single daily injection of this type of insulin would control most diabetics. Mosenthal (1944) reported on a series of 50 ambulant diabetics treated with globin insulin (G.I.) and showed that as a rule G.I. produces a fall in blood sugar within two hours of injection. This effect is intermediate between that of soluble insulin (S.I.) and zinc protamine insulin (Z.P.I.). The action lasts for 12 to 16 hours and sometimes 24 hours, depending on the size of dose and other factors.

Eaton (1944) reported on a series of 41 diabetics treated with G.I. who had failed to do well on other types of insulin. He showed that a combination of Z.P.I. and S.I. produces a lower fasting blood sugar than G.I., but that in suitable cases G.I. gave results more nearly physiological than did any other single type of insulin, and that its action closely resembled that of mixed doses of Z.P.I. and S.I. containing over 50% of the latter.

These favourable reports encouraged other clinicians to use G.I. Wauchope (1948) reported enthusiastically on a series of 366 diabetics treated with G.I. as out-patients thus: "All types of patient do as well on a single dose of globin insulin each day as on other kinds of insulin, singly or in combination." This has not been quite the experience at the diabetic clinics of the London Hospital, and I was prompted, therefore, to review the records of diabetic patients who had been treated with G.I. since its introduction in 1943. In that year a large number of patients attending the London Hospital were changed from a twice-daily dose of S.I., or a single combined dose of S.I. and Z.P.I., to a single daily dose of G.I. This dose was usually two-thirds of the previous total dose of other insulins. In addition, a small number of new diabetics were treated with G.I. from the start. Out of a total of approximately 1,800 diabetics treated between 1943 and 1948, 360 were given G.I. In 55 of these, control of the diabetes proved unsatisfactory, so that a change to some other kind of insulin had to be made.

It is of interest to note at this point that during the same period over 750 patients were being maintained satisfactorily on a twice-daily dose of S.I. or a combined daily dose of Z.P.I. and S.I.

The methods of control were those in general use at diabetic clinics. Some patients attended weekly or fortnightly, others at monthly or three-monthly intervals. The urine examined was the early morning specimen, unless otherwise stated, using Benedict's reagent. Control was mainly by the result of urine examination, blood sugars being estimated in difficult cases. The diet employed during the period was the calorie-control type of Crooke and Scott (1943); usually of 2,000 calorie value, but higher in adolescent subjects and lower in the overweight and more elderly.

Of the 305 cases successfully treated by G.I. the majority were elderly patients with diabetes of no more than moderate severity. Only 36 (12%) were under 40 years of age, and 79% received a single daily dose of G.I. of less than 40 units. Thus the cases successfully treated by G.I. were usually not severe and they belonged to the older age groups. Such cases are usually easy to control on any regime.

Of the 55 cases who failed on G.I., 22 were males and 33 females. The majority were young (18 were below the age of 40—i.e., 35%). The 55 cases were made up of (*a*) 17 new diabetics who began treatment on G.I.; and (*b*) 38 old diabetics who had previously been treated with either twice-daily S.I. or a once-daily injection of Z.P.I. and S.I. Of this latter group all except one were receiving more than 30 units of insulin per day.

The patient who is poorly controlled on G.I. often shows a characteristic picture. He is usually under middle age, and his diabetes is of moderate or greater severity. He complains of nocturnal thirst and polyuria, and an early morning specimen of urine will show heavy glycosuria (more than 2% sugar, Benedict's test brick red precipitate). There is usually steady loss of weight (7 patients lost over a stone (6.3 kg.) in weight, and 13 patients over 10 lb. (4.5 kg.) in weight, in periods varying from three to nine months). Female patients complain of troublesome pruritus vulvae. If the dose of G.I. is increased to overcome these symptoms midday reactions usually occur, as happened in 18 of these cases.

The reactions tended to occur about four to six hours after taking the insulin. Ten patients suffered reactions at midday, eight in the late morning, and two in the late afternoon. Those patients who had experienced reactions from S.I. or Z.P.I. usually complained that G.I. produced more severe reactions. The feature that particularly worries the patient is the suddenness of the reaction. Patients on a single daily morning dose of G.I. should therefore have their main meal of the day at midday.

I believe that this combination of nocturnal thirst and polyuria, with midday or afternoon reactions if the dose of insulin is increased, along with heavy morning glycosuria, loss of weight, and pruritus vulvae in women, constitutes a clinical picture which might be called the "failed-globin syndrome," and it is not uncommon when globin insulin is used in unsuitable cases. When it appears, a different insulin arrangement is obviously necessary. This may be either a twice-daily dose of S.I., or often more conveniently a combined daily morning dose of Z.P.I. and S.I.

As would be expected, if a patient continues with a heavy glycosuria, the risk of ketosis is increased. Ten of these patients had episodes of ketosis while taking G.I. Since changing back to S.I. twice daily or S.I. and Z.P.I. there has been only one incident of ketosis, in a patient with cellulitis of the leg, among the 55 cases.

All of the 55 patients have subsequently been adequately controlled on a twice-daily dose of S.I. or on a combination of Z.P.I. and S.I. Over 80% of them have now been under observation for a further two years. The glycosuria has been stemmed, with gain in weight and relief from nocturnal thirst and polyuria. The troublesome nocturnal pruritus vulvae has disappeared in nine out of ten women affected.

Conclusions

(1) Globin insulin is often successful in the treatment of diabetes of older persons when the total daily dose of insulin does not exceed 40 units.

(2) Young and severe diabetics, when treated with a single daily injection of globin insulin, may show heavy morning glycosuria and suffer from nocturnal polyuria, thirst, and loss of weight.

(3) An increase in the dose of globin insulin in such patients usually produces midday reactions without relief of these symptoms.

(4) Such patients can be better controlled by a twice-daily dose of soluble insulin, or a combination of soluble insulin and zinc protamine insulin.

It is a pleasure to acknowledge the help and criticism of Dr. R. R. Bomford and Professor Clifford Wilson in preparing these notes, and the permission to use the case histories of their patients.

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SOME ASPECTS OF SCHISTOSOMA MANSONI INFECTION

BY

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Extensive subperitoneal miliary infiltration of the small intestine by *Schistosoma mansoni* and enlargement and heavy invasion of the mesenteric and retroperitoneal lymph nodes by ova of the same schistosome are rare enough to warrant being recorded. The post-mortem findings of three cases are therefore given.

Case Reports

Case 1. "Miliary Schistosomiasis" of Subserous Surface of Small Intestine.—A man aged 35 was admitted to hospital on September 14, 1949, with acute dysenteric symptoms. *Sch. mansoni* ova were found in his stools. He died five days later. On post-mortem examination the outer surface of the whole length of the small intestine was found to be studded with tiny nodules which were macroscopically indistinguishable from miliary tubercles. Only a few such tubercle-like lesions were seen on the surface of the lowermost portion of the large bowel. The mesenteric and retroperitoneal lymph nodes were moderately but universally enlarged. Some were haemorrhagic. The outer surface of most of the large bowel as well as the parietal peritoneum were devoid of nodules. The inner lining of the small intestine was congested and showed some minute submucous haemorrhages, but no ulceration or overgrowth. Ulcers and polypoid growths were, however, seen on the mucous surface of the whole length of the large bowel. The liver was cirrhotic. Scrapings from the miliary nodules on the surface of the small intestine revealed large numbers of ova of *Sch. mansoni*, while digested sections (with sodium hydroxide) of the mesenteric and retroperitoneal lymph nodes were simply clumps of such ova. They were negative for tuberculosis.

Case 2. Heavy Adult Infection; Enlargement and Heavy Invasion of Mesenteric and Retroperitoneal Lymph Nodes by Ova.—A man aged 30 was admitted on September 11, 1949, with acute watery diarrhoea. On admission he was extremely toxic, dehydrated, and anaemic. Stools were positive for *Sch. mansoni* ova. He died ten days later. At necropsy a very heavy adult infection of the portal vein and of its intrahepatic tributaries was found. Most were present in the portal vein. The cut surface of the liver, which was soft and dark red, showed many adult worms as well as ova. The mesenteric and retroperitoneal lymph glands were all enlarged and were teeming with ova. The transverse and descending colon showed extensive submucous polypoid growths and ulcers.

Case 3. Minimal Intestinal Lesions; Enlargement of Mesenteric Lymph Nodes.—A man aged about 40 was admitted on August 8, 1949, for fever. He had no intestinal symptoms or signs on admission. Blood culture was positive for *Salmonella paratyphi A*. He went downhill and became more and more toxic and anaemic. A terminal diarrhoea developed and he died on September 26. Stool examination was negative for schistosoma ova. On post-mortem examination the mesenteric lymph nodes were slightly enlarged. Sections showed the presence of many ova. The mucous membrane of the small intestine was slightly congested, while that of the large bowel was a trifle thickened. There were no overgrowths or ulcers. The liver was slightly enlarged but otherwise normal.

Comments

The points of interest in these cases are:—Case 1: the miliary lesions, their simulation of miliary tuberculosis, and the heavy infection of the mesenteric and retroperitoneal lymph nodes. Case 2: the heavy adult infection of the portal system and enlargement of the lymph nodes. Case 3: the paucity of intestinal lesions while the lymph-node infection was the predominant feature.

Subserous miliary schistosomal infiltration of the small intestine is an abnormal feature in *Sch. mansoni* infection, which could easily have been mistaken for miliary tuberculosis, while enlargement of the mesenteric and retroperitoneal lymph nodes is rare. Small-intestinal and lymph-node lesions are, however, the usual findings in Asiatic schistosomiasis.

The most interesting feature of these cases is therefore that their pathology resembles in some respects that of *Sch. japonicum* infection.

In *Sch. mansoni* infection the organs and tissues most seriously involved are the colon and rectum, though eggs carried in the mesenteric current into the portal vessels may filter out in the liver and lead to cirrhosis.

The essential difference in *Sch. japonicum* infection is the location of the adult worms and the discharge of ova primarily in the mesenteric vessels draining the small intestine. Thus the organs and tissues most seriously involved are jejunum, ileum, appendix, and mesentery. But the relatively short distance for transportation of eggs in the mesenteric current into the intrahepatic portion of the portal vessels and the large numbers of eggs discharged by *Sch. japonicum* females combine to set up periportal fibrosis and other visceral lesions—for example, lymph nodes—as more important in this disease than intestinal lesions.

It is stated that the same schistosome may present different pathological features in different parts of the world. It may therefore be that lymph-node involvement is not an uncommon feature in Sudan schistosomiasis (*mansoni*). Many post-mortem examinations are required to prove this.

I am indebted to the Director of Health Services for permission to publish these cases, and to Dr. R. Kirk, assistant director of research, for his kind criticism and comments.

A report on the British Legion Village covering the years 1947–9 has recently been issued. It pays tribute to the work of Professor F. R. G. Heaf, consulting physician to the Village, whose methods are used in the training schemes. Over 10,000 tuberculous ex-Service men and women of the 1914–18 war have benefited from the services provided by the Village, and many of the second world war are now doing so. The hospital section of the Village has been transferred to the Ministry of Health, but the settlement will still be considered as a unit. Throughout the organization national scales of salaries and wages are paid, and men undertaking full hours of occupational therapy receive increases in wages in accordance with their technical skill. This arrangement benefits morale, since the disabled men know that they are working under conditions like those of their fellows in the outside world.

Medical Memoranda

Uterine Sepsis from Unabsorbable Sutures

The following case report may be of interest to those obstetricians who still advocate the use of unabsorbable ligatures for sewing up the uterine wound after caesarean section.

CASE REPORT

A woman aged 44 was admitted to the Royal Masonic Hospital on August 8, 1949, complaining of irregular uterine bleeding and a purulent vaginal discharge. The average duration of her menstrual period was 7 to 14 days, and the cycle was irregular. The loss was variable, but enough to cause a moderate anaemia. In 1938 an artificial menopause had been induced with radium, but her periods had returned after three months' amenorrhoea and had continued since. She had had two children, aged 19 and 13 years, both delivered by caesarean section. The Fallopian tubes had been tied at the second operation.

Uterus with abscess, showing old caesarean suture.

As this was a case of persistent irregular haemorrhage after radium it was considered advisable to perform a total hysterectomy, and this was undertaken on September 5. The uterus was found to be densely adherent to the anterior abdominal wall by a broad adhesion about 1 in. (2.5 cm.) in diameter. This was dissected away from the anterior abdominal wall and a small abscess, containing frank pus and several long strands of silk ligature, was opened in the middle of the adhesion. The abscess connected with the cavity of the uterus and there was a nest of silk sutures in the abscess.

On section, the myometrium showed considerable fibrosis, possibly the result of the radium menopause. The wound was closed, with drainage to the extraperitoneal space, and the patient had a smooth convalescence. The accompanying illustration shows the uterus with adhesions cut away and a probe passing down the abscess cavity into the uterine cavity. The thick plaited strands of silk are clearly visible, and one or two strands have been removed to show that they are no more absorbed than on the day when they were inserted. The cause of the bleeding and discharge was a stitch abscess in the endometrium.

Most gynaecologists condemn the use of unabsorbable ligatures in the uterus, but a few still advocate the practice. This case is perhaps instructive in showing that such sutures are never absorbed and may give rise to serious mischief—in this case over 13 years after their insertion. I would further submit that nylon used for suturing the uterine incision after caesarean section may well give similar trouble in the future. Though not ideal, catgut is the best suture material to use in the uterus.

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Volvulus of Transverse Colon Complicating Labour

The following case is reported because of its rarity and also because it brought to mind that host of differential diagnoses of collapse occurring during labour and in the immediate period post-partum.

CASE REPORT

A woman aged 22, in her third pregnancy, was admitted at term with abdominal pain and nausea on the evening of May 12, 1949. Her past general and obstetric history was normal. She was believed to be in labour. Her blood pressure was 160/110, pulse rate 130, and temperature 97.8° F. (36.55° C.); the urine contained a heavy cloud of albumin. The foetus was presenting by the vertex, and the head was engaged. The foetal heart rate was 84, and the rhythm was irregular.

As she was thought to be in the pre-eclamptic state, treatment was carried out in the routine manner. Six hours after admission an asphyxiated female infant, weighing 7 lb. 9 oz. (3.4 kg.), was delivered spontaneously and survived after resuscitative treatment. The mother collapsed and was treated for obstetric shock. Moderate abdominal distension and generalized tenderness was then discovered. She vomited during the night, and eight hours after the birth her blood pressure was 70/50 and her pulse rate 156.

Gastric suction was begun and intravenous fluids were administered. She had received an enema shortly before admission, but since then had passed neither faeces nor flatus. Her condition did not deteriorate further. Two days after the child was born a lump could be felt in the abdomen above and to the right of the umbilicus. The abdomen was tender, and the fundus of the uterus was felt 3 in. (7.5 cm.) above the symphysis pubis, 1½ in. (3.75 cm.) from the lower border of the tumour.

Four and a half days after the onset of abdominal symptoms laparotomy was performed by Mr. Keith Vartan under general anaesthesia. The lump was found to be distended transverse colon: the mesocolon was longer than normal, and the ascending colon was freely movable. A volvulus had occurred, involving the upper half of the ascending colon and the proximal two-thirds of the transverse colon. It was thought that the mesentery had become untwisted to some extent spontaneously, and nothing was done by the surgeon, apart from completing the untwisting. The other abdominal viscera were examined and found to be normal. The patient was discharged with her baby on June 8, 28 days after admission.

COMMENT

Involvement of the ascending and transverse colon is rare in volvulus occurring during pregnancy. All authors consider the condition from the point of view of intestinal obstruction and discuss the maturity of pregnancy at which such obstruction is most common. Lambert (1931) found the greatest number of cases of volvulus at term or during labour. Kohn *et al.* (1944) also found the last trimester to be the most common time, but remark the strangeness of its occurrence at a time when the abdomen is so distended by the pregnant uterus that torsion of abdominal contents would seem most difficult. On the other hand, it is easy to see the strength of the theoretical argument of Spence (1937) that immediately after delivery there is such a great alteration in the position of the alimentary tract that it is a wonder volvulus is not more common at that time.

The case reported was characterized by three features: (1) the extreme degree of peripheral vascular failure complicating labour and the immediate period post-partum; (2) the dominance of this feature over all other signs and symptoms, and (3) the spontaneous partial resolution of the pathological condition. For, indeed, vomiting as a symptom

was not such as seriously to lead to the suspicion of alimentary obstruction, and constipation was minimal. The enema return was satisfactory and the post-partum abdominal distension was not significantly greater than that occasionally seen after uncomplicated childbirth. Finally, the patient was undoubtedly suffering from pre-eclampsia.

I wish to thank Mr. Keith Vartan, medical director of the British Hospital for Mothers and Babies, London, S.E.18, for permission to publish this report and for his encouragement and suggestions.

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Massive Lipoid Deposit in Atrophied Muscle

The following case is of interest not only on account of its rarity but because of the increasing importance which is being attached to the role of the fat-storage depots in diabetes mellitus.

CASE REPORT

A married woman, aged 46, with eight children, gave a history that in 1932 she had developed a severe cold and sore throat, and that four days later weakness of the left ankle had ensued which spread upwards until, in three days, the entire limb was paralysed. The leg then became painful, and despite rest in bed the pain involved the whole leg from the buttock down to the foot. The pain gradually decreased over the succeeding nine months, during which time she remained in bed. As the pain decreased the wasting of the leg and buttock became progressively worse. On gradually resuming activity she regained considerable use in the leg, though movements at the ankle were impossible. This improvement continued, without any treatment, for the next 16 years. In March, 1948, the left calf began to swell, at first mainly at night, but later it remained permanently swollen and slightly tender. The patient did not consider the condition a great disability and she had had three children since its onset in 1932.

On examination she was seen to be a short, very stout woman, rather pallid, with sparse hair and eyebrows. She walked with a stick, dragging the left leg, but was not greatly handicapped. All muscles of the left thigh and buttock were grossly wasted, being 3 in. (7.5 cm.) less than the right in circumference; the calf appeared hypertrophied, the tissues being firm, tender, and measuring 1½ in. (3.7 cm.) more than the right. Power was grossly diminished on the left, being fair at the hip and poor at the knee; the movements of dorsiflexion and plantar flexion of the foot were very small. The tendon reflexes were totally abolished in both limbs, except for the right knee-jerk, which was just detectable. No other abnormality was discovered.

On admission to hospital she was found also to be suffering from diabetes mellitus. Electrical reactions for the muscles of the left leg gave no response either to faradic or to galvanic stimulation. A biopsy of the left calf (by Mr. J. M. Sanderson) showed that the superficial tissues were normal, but the "muscle" was seen to be totally replaced by soft, yellowish white fatty tissue with occasional more resistant areas suggestive of fibrous remnants of muscle bundles. Dr. W. St. C. Symmers, reporting on the microscopical appearances, stated that the muscle was replaced by mature adipose tissue in which small blood vessels and nerve bundles were scattered. Occasional distorted skeletal muscle fibres remained, and small groups of what appeared to be sarcolemmal cells.

COMMENT

The neurological disorder which precipitated the extreme wasting of this patient's leg in 1932 can now be diagnosed only by presumption, but it seems to have been an infective condition of the nervous system, such as an acute poliomyelitis or polyradiculitis, a theory which finds some support in the absence of reflexes in the other limb and their gross diminution elsewhere. Nor can the duration of the diabetes be estimated, as the patient had no symptoms whatsoever: however, glycosuria had not been noted at the out-patient department four months before admission.

It has been known for many years that fatty infiltration precedes and accompanies the atrophy of muscle fibres following lesions of the anterior horn cells such as occur in poliomyelitis (Vulpian, 1870), but excessive deposition of fat to the extent of limb hypertrophy has not been recorded as a sequel to this disease. The outstanding condition in which fatty replacement of muscle fibres occurs is, of course, the pseudohypertrophic muscular dystrophy, but the clinical and histological features of this case were entirely different.

Complete fatty replacement of the soleus of one limb, discovered at post-mortem, was described by Barnes (1932) in a member of a family showing a hereditary myopathy. Weaver and Maun (1942) described a case in which, during post-mortem dissection, the gastrocnemius and soleus on one side were found to have been completely replaced by fat. This was unsuspected during life. Both these patients died of cardiac disease with oedema of the extremities, and it is interesting to note that my patient stated that the swelling of the calf at first came on only towards the end of the day, suggesting that a peripheral oedema, not uncommon after poliomyelitis, may have preceded the permanent deposition of fat.

The other feature of this patient's condition—the diabetes—is also interesting, for in the knowledge that fat deposits in internal organs are commonly associated with diabetes (Goldzieher, 1927), and that high lipaemia is a phenomenon of the severe disease, it is tempting to associate the two conditions in this case.

I wish to thank Professor P. C. P. Cloake for permission to publish this case and for invaluable criticism.

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Nearly 15% of the Fijian population is affected by filariasis, according to a report just issued by the Filariasis Control Division in Suva, Fiji, after a five-year investigation. Blood samples were taken from 61,967 Fijians, or nearly 81% of the inhabitants of 1,150 villages. Results showed that 14.84% of those tested had microfilaria in the blood stream. In males the percentage was 18.23; in females 11.37. The difference may be due to the fact that the clothing worn by men leaves more of the body exposed to mosquito bites. Filariasis is carried in Fiji by a species of mosquito which bites during the day-time. It shelters in long grass or bush, and its flight range is limited to a maximum of 150 yards. The control methods, therefore, are to destroy all possible breeding-places, clear villages of all possible shelter, and then clear all bush in a belt 100 yards wide round each village. These methods are simple, but they require continuous community team-work among the villagers, which is not always easy to obtain. Next year the Filariasis Control Division will make blood tests in selected areas where the control methods have been in force for five years, with the object of finding out how effective this control has been. It is also intended to experiment with other methods of control, including the mass use of the drug "hetrazan," the spraying of villages with D.D.T., and a combination of these with the existing method.

Reviews

X-RAY DIAGNOSIS

A Textbook of X-ray Diagnosis. By British authors. Volumes 3 and 4. Second edition. Edited by S. Cochrane Shanks, M.D., and Peter Kerley, M.D., F.R.C.P., F.F.R., D.M.R.E. (Volume 3, pp. 830; 694 illustrations. £3 10s. Volume 4, pp. 592; 553 illustrations. £3.) London: H. K. Lewis and Co. 1950.

The immense advances made by medical science in the last 30 years are such that only by team work can their fruits be fully gathered. In no branches is this more certain than in radiology and surgery, and it is only by the close co-ordination of the surgeon and the radiologist that either can succeed. The modern radiologist must have a full appreciation of the problems confronting the surgeon and of the attempts which he makes at their solution, while the surgeon must understand fully the assistance which the radiologist can afford him and the great advances which his art has made. It is one of the most remarkable features of these volumes that these axioms have been fully grasped; as a result they may be read with equal pleasure and profit by either the radiologist or the surgeon.

Throughout the work another principle of the greatest value has been followed. In each section a short though precise anatomical description has been given, illustrated by radiographs of normal anatomy, of the region concerned. It is only after this substantial foundation that abnormalities are described, with illustrations so clear that no doubt can arise about their nature. Moreover, in every case a brief account is given of the surgical procedures required, and the picture is completed by *x*-ray photographs which show the results achieved.

Volume 3 covers a wide field; it includes discussion of the whole alimentary tract, the abdomen, the urinary tract, and obstetrics and gynaecology. Most of the account of the alimentary tract is by Cochrane Shanks, and it is a masterly achievement. The normal stomach and the abnormal conditions which may occur are illustrated by admirable radiographs, and the same course is followed with great skill in the case of the duodenum. This is followed by one of the most important chapters in the volume, describing and illustrating the results of the various surgical procedures which have been adopted. We cannot imagine any account which could be read with more interest by an abdominal surgeon, or one from which he would derive information of greater value. The chapter on the diaphragm is indeed a great achievement, for it gives a complete epitome of what is known on this difficult subject. The developmental anatomy is briefly but accurately described and is so admirably illustrated by diagrams and radiographs that it can be clearly understood. The whole article attains a high scientific level, and the research involved is indicated by the complete bibliography which is attached.

The biliary tract is discussed by Peter Kerley and illustrated by superb examples of radiography. The precise information given on how these are obtained will be welcomed by every worker in this field. Kemp Harper contributes an article on the liver, spleen, and pancreas, with excellent illustrations of the difficult problems involved.

The urinary tract is discussed by Cochrane Shanks and Johnstone and reaches the same high level as the rest of the volume. The account of the precise details of the various procedures required for the successful performance of urography, which is followed by a discussion of the difficulties, will be of value to surgeons as well as radiologists, and both will envy the superb results which are here so admirably illustrated.

The great advances of radiology in obstetrics during the last 20 years are admirably described by Rohan Williams. He gives a clear and fascinating account of a field of research which must have an important influence on the future of the art of obstetrics and assist in its further advance as an exact science. The difficult subject of *x*-ray pelvimetry is made clear by excellent diagrams, while perfect radiographs, some demonstrating the placental site and some showing the actual process of labour, suggest the possibilities of the future.

Volume 4 is on the bones and joints and follows the lines we have already indicated. The many and perfect radiographs show clearly every abnormality, whether from injury or disease, with which the surgeon is likely to meet. Two articles, however, call for special mention. The first is by Baker on the general pathology of bone. He not only gives a clear description of the normal growth and structure of bone but describes with equal clarity the complex processes by which bone is absorbed and replaced. The second is an article by Hunter and Jupe on the constitutional diseases of bones and joints. They describe fully the disturbances of growth, nutrition, metabolism, and of the endocrine glands, giving a clear account of a most complex and important subject. Both articles are on a high scientific level and elucidate many problems in connexion with the skeletal system. Their inclusion in this volume adds greatly to its value.

The editors and the many contributors to these volumes are to be congratulated on a really superb achievement.

HENRY SOUTTAR.

POCKET-BOOK OF OSTEOLOGY

Osteology for Dissectors. A Tutorial Pocketbook. By Robert King Howat, M.B., C.M.(Glas.), F.R.C.S.(Eng.), F.R.F.P.&S.(Glas.). (Pp. 292; 46 illustrations. 15s.) London: Henry Kimpton. 1950.

This booklet is described as "an attempt to meet a desire for notes on osteology that can be used conveniently in the dissecting room as well as at home." It is doubtful whether such a desire really exists or, if it does, to what extent the present work will meet it. Mr. Howat's book, both in style and in content, is essentially a rough compilation of tutorial notes. In notes of this short compass there must inevitably be a number of omissions, many of which have been judiciously made. One would have thought, however, in view of the emphasis placed on the clinical applications of anatomy, that the nucleus pulposus might at least have been mentioned in describing the articulations between the vertebral bodies.

There is room for considerable improvement in the diagrams. Most teachers of anatomy endeavour to simplify their diagrams so that they may be the more readily understood and learnt by students, and within limits it is a matter of personal taste how far such simplification should proceed. It is astonishing how informative the simplest of line diagrams can be, but the diagram must bear a reasonable resemblance to the original. Some of the diagrams in the present work have been over-schematized to the point of being misleading or unrecognizable—for example, Figs. 1, 3, and 26. It is perhaps only fair to add that Mr. Howat does not stand alone in this respect, and that the practice of making anatomical diagrams too diagrammatic has grown increasingly in recent years.

J. M. YOFFEY.

THE SENSITIVE NOSE

The Nose: An Experimental Study of Reactions Within the Nose in Human Subjects During Varying Life Experiences. By T. H. Holmes, M.D., and others. (Pp. 154; 37 figures. 32s. 6d.) Oxford: Blackwell Scientific Publications. 1950.

In this carefully documented book the authors correlate the effects of environment and social factors with the reaction of the nasal mucous membrane. Rhinologists have long realized that sneezing, nasal engorgement, and excessive secretion, three factors in the entity known as vasomotor rhinitis or spasmodic rhinorrhoea, while often a response to a specific irritant, are nearly always associated with an unstable emotional background.

In this work the facts are established beyond dispute by a meticulous clinical examination of the nasal mucosa carried out concomitantly with an analysis of mental conflicts in a wide variety of people. While in many people placed in situations of conflict there is but little change in the nasal mucosa, it is convincingly established that in the susceptible the same emotional situations tend to give rise to the same physical reactions over and over again; and in unresolved and chronic cases these reactions may become an irreversible pathological state. The same team of research workers performed a similar survey on the effects of emotional disturbances on gastric mucosa, and in one case with a large gastric fistula it was possible to correlate the nasal reactions also. The findings were significantly parallel.

It is suggested that the occlusion of the nasal passages which occurs is a manifestation of a desire to shut out noxious or harmful influences and its relationship to such varying conditions as "specific threats to respiratory apparatus; general threats to bodily integrity; home environment; relations to siblings; fear, anger, hostility, and resentment; sexual function, menstruation, and pregnancy." While it is not implied that all nasal disease stems from difficulties in interpersonal and social adjustment, nevertheless they occupy a position of importance and may modify the course of morbid processes.

No suggestions are made about treatment, but the conclusion is inescapable that the salvation of many must depend, if not on psychiatry, at least on the good offices of social welfare workers. This is a good piece of work which greatly needed to be done.

F. C. W. CAPPS.

MEDICINE IN GERMANY

Lehrbuch der Inneren Medizin. By H. Assmann and others. Edited by H. Schwiegk and A. Jores. Volumes I and II. (Pp. 1,984; illustrated. No price.) Berlin: Springer. 1949.

The new edition of this textbook has an interest transcending that of its intrinsic merits, for it is one of the first works of its kind to be published in post-war Germany. Thus it gives the reader a conspectus of authoritative German teaching which has been denied to him since 1939. In this respect the opening section, in which Professor Siebeck discusses such general notions as the aim of medicine, the nature of ill-health, and diagnosis, is of particular value. These topics are not mentioned in textbooks in the English language, and the problems they raise are unsuspected by many students.

Thereafter the book follows conventional systematic lines. It is remarkable both for the detail and for the wide range covered by its various contributors. The general discussions of such matters as infection, fever, immunity, and epidemiology by Professor Doerr are particularly noteworthy. The differences from comparable English textbooks are chiefly those of emphasis. Some of these may be traced to difficulty of supply; for instance, in the section on the general treatment of infective diseases, the antibiotics, of which only penicillin and streptomycin are mentioned, are accorded less space than the sulphonamides. In considering heart disease the approach remains that of the morbid anatomist, and the importance of aetiology is disregarded. Electrocardiography is treated superficially, and only limb leads are mentioned. No attempt is made to assess the value of streptomycin in pulmonary tuberculosis, although all other aspects of this disease are most adequately considered. Of the other sections, that by Professor Heilmeyer on blood diseases requires mention for its special excellence.

Such criticisms are only of minutiae. In the present edition this well-known textbook fully maintains its reputation and bears witness to the international character of latter-day medical practice. It can be warmly recommended to the English reader.

R. BODLEY SCOTT.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

Techniques in British Surgery. Edited by R. Maingot, F.R.C.S. (Pp. 733. 75s.) London: Saunders. 1950.

Plastic and Reconstructive Surgery. By F. Smith, M.D., F.A.C.S. (Pp. 895. 75s.) London: Saunders. 1950.

Faith Healing and Healing Methods Founded Thereon. By M. Shipsey, M.B., B.Ch. (Pp. 123. 10s. 6d.) Birmingham: Michael Shipsey. 1950.

Tuberculosis Control in a British Colony. By V. Hetreed, M.B., B.S. (Pp. 50. 7s. 6d.) London: National Association for the Prevention of Tuberculosis. 1950.

The Four Pillars of Wisdom. By Sir Sheldon F. Dudley, K.C.B., F.R.S. (Pp. 246. 8s. 6d.) London: Watts and Company. 1950.

Emergencies of Childhood. By R. Gamlin, M.A., M.B., B.Ch., M.R.C.S., L.R.C.P., M.H., D.P.H. (Pp. 64. 6s.) London: James Nisbet. 1950.

The Psychology of Intelligence. By J. Piaget, D.Sc. (Pp. 182. 15s.) London: Routledge and Kegan Paul. 1950.

A Textbook of Gynecology. By A. H. Curtis, M.D., and J. W. Huffman, M.D. 6th ed. (Pp. 799. 50s.) London and Philadelphia: W. B. Saunders Company. 1950.

Medical Diagnosis: Applied Physical Diagnosis. Edited by R. L. Pullen, M.D., F.A.C.P. 2nd ed. (Pp 1,119. 63s.) London and Philadelphia: W. B. Saunders Company. 1950.

Les Frottis Vaginaux et Cervicaux. By J. P. Pundel. (Pp. 350. 2,000 francs.) Paris: Masson. 1950.

Thérapeutiques Cardiologiques Internationales. By C. Lian. (Pp. 167. No price.) Paris: L'Expansion Scientifique Française. 1950.

Werdnig-Hoffmann's Infantile Progressive Muscular Atrophy By S. Brandt. (Pp. 328. 20 Danish kronen.) Copenhagen: Ejnar Munksgaard. 1950.

Grundriss der chemischen Physiologie. By F. N. Schulz. (Pp. 234. M. 7.50.) Jena: Gustav Fischer. 1950

Wesen und Herkunft endogener Pigmente. By B. Oebike. (Pp. 92. M. 10.80.) Jena: Gustav Fischer. 1950.

Grundsätzliches zur Diabetestherapie. By F. Bertram (Pp. 40. M. 1.) Stuttgart: Georg Thieme. 1950.

Lehrbuch der Röntgendiagnostik. By H. R. Schinz and others 5th ed. (Pp. 878. M. 70.) Stuttgart: Georg Thieme. 1950.

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A SECRET REMEDY FOR CANCER

A weekly with a large popular circulation, *Picture Post*, has recently thought fit to champion a cancer treatment practised by a Mr. D. Rees Evans and to demand a full official trial, which they say has hitherto been refused. In furtherance of this aim they have circulated to certain scientific bodies a record containing case histories and experiments on which their claim is based, together with some account of the treatment. The evidence in favour of the treatment has been compiled by Mr. D. W. Morley, a biologist with no medical training, who has previously done research on the habits of ants and has been for some months a scientific journalist. Rees Evans, "having no scientific training himself . . . was unable to undertake any research on his own behalf. Such research has now at last been undertaken in the U.S.A." Sixteen cases of cancer were made available to him for treatment in the Presbyterian Hospital, Newark, N.J. According to Mr. Morley, Mr. Evans went to the U.S.A. "to obtain the test of his methods of treatment which he had failed to get in Britain. . . ." And Mr. Morley, in the record referred to, stresses the American work "because it is the most detailed, both in records of treatment and methods of diagnosis." Mr. Morley, acting as a sort of scientific compère for Mr. Evans, evidently sets great store by the American experiment: "discussion of the English cases is of necessity less detailed . . . [partly] because in many of the cases the diagnosis is less certain." The Presbyterian Hospital is officially recognized by the American College of Surgeons and by the Council on Medical Education and Hospitals. It is evidently, as our friends in the U.S.A. say, in "good standing." To learn if any further light could be thrown on Mr. Evans and his treatment we asked for information and received this cable in reply from the "Tumor Therapy Committee" which sponsored the investigation (periods inserted):

> "Work entirely experimental. No definitive results obtained. Evans statement unwarranted and unauthorized. No results to be published. Would disavow all unproven claims by Evans."

The Tumor Therapy Committee evidently refused to go any further with the trial of Mr. Evans's treatment unless he agreed to divulge the composition of his drug or drugs to the Food and Drug Investigation and to one or more members of the committee "so that clinical evaluation of Mr. Rees Evans's preparations and method of treatment can be carried out ethically in accordance with the usual procedures of the leading scientific and medical societies of this country. . . ." Mr. Evans, it appears, thereupon returned to England—and to *Picture Post*, which took upon itself to present to the British public evidence on his behalf, resorting to the startling device of beginning its article on the cover of the magazine.

No doubt the exponents of Mr. Evans's treatment are acting in all sincerity. No doubt the Editor of *Picture Post* sees himself as the champion of the unorthodox and as a bold innovator in the history of scientific journalism. No doubt it would be only human on his part to appreciate the publicity value for his magazine of this strange incursion into the complicated and baffling nature of the treatment of a disease which claims an ever-increasing number of victims in an ageing population. No doubt, too, unfortunately, the hopes of many sufferers will be tragically raised that here at last is something which will cure cancer. It is true the caution is uttered that "this is not . . . a general 'cancer cure.' This is a treatment which—we claim—has achieved success over a period of years in certain cancer cases, when carried out by a particular person." But the untutored reader will be heavily influenced by the peculiar evidence of the photographs. In treating in this manner such a difficult question *Picture Post* has done a grave disservice to science and to the British public.

What is the evidence thus presented in all the glare of modern journalistic presentation? Mr. Evans, in investigating whose work *Picture Post* "has spent thousands of pounds," went to the U.S.A. in November, 1949, and returned in May, 1950. During this time he treated sixteen cases of cancer. Of these sixteen patients four died, and three others were regarded as unsatisfactory for other reasons. It is claimed that the remaining nine "were completely cured," but one of these was "believed" to have developed metastases since the completion of the treatment and is dead—according to Mr. Morley from pneumonia. A second cable from the Tumor Committee in America informs us that another patient for whom partial success in treatment is claimed is now dying; also that no biopsies were obtained in three patients said to be cured, though it is claimed in the *Picture Post* records that biopsy was obtained in two of these. Much is made in this magazine of the so-called cure obtained in the case of Rousch (spelt Rauch on the same page). The cable from America informs us that "Rausch skin cancer now requires surgery kidney mass": is this the same mass described in *Picture Post* as "white kidney stones"?

It is difficult to understand how Mr. Morley can state on one page of *Picture Post* that "nine cases were completely cured," and on the opposite page write this: "As these cases in America were treated within the past twelve months it cannot be established that they will not suffer from a return of the disease." In the light of this second, and accurate, statement the first is dangerous nonsense.

Mr. Evans inherited his therapeutic armamentarium from his uncle and father, David and John Evans. In 1907 another journalist, Mr. W. T. Stead, took up the cudgels on behalf of what was known as the Cardigan Cancer Cure and against the medical profession. The pretentiousness of these claims was exposed in these columns at that time.[1] A year later, in 1908, Mr. Lynn Thomas described a case of cancer of the breast "cured" by Mr. John Evans, who had then come under his, Mr. Lynn Thomas's, care.[2] Mr. Thomas published photographs which showed extensive scar tissue at the site of the right breast, with cancerous ulceration. Another photograph showed the breast at the time of treatment by Mr. Evans—the surface converted into a mass of dark, necrotic tissue. This bears a very close resemblance to one of the photographs in *Picture Post* of a treated cancerous breast. Analysis of the necrotic tissue and of the fluid used by the Evans brothers in 1908 showed the presence of a high percentage of zinc chloride. The caustic effect of this has been exploited in many "cancer cures," often in the form of pastes. Mr. Rees Evans claims to have improved on his father's remedies, but the *Picture Post* photographs strongly suggest that whatever is applied destroys the skin and the breast tissue immediately under it. As Mr. Evans has so far refused to disclose the constituents of his remedies, it would be legitimate to suppose that its principal ingredient is zinc chloride—the favourite prescription of many self-dubbed cancer-curers of the past and present in Mr. Evans's father's remedy. But information in the second cable from the Tumor Therapy Committee suggests there may be something else as well. We give the information as received (periods inserted).

> "Patients exhibited effects colchicine. Although nature drug not known pharmacologist chemists agree possibly some form colchicine orally. Mixture colchicine plant material plus acid possibly tannic to skin. Several patients exhibited gastrointestinal symptoms cerebral disorientation convulsions local muscular spasms and severe pain."

Mr. Evans had the opportunity of submitting his treatment to authoritative investigation in 1923, when he appeared before a Ministry of Health Cancer Committee. He refused to disclose the nature of his remedy. He refuses in 1950 to reveal his secrets to the U.S.A. Food and Drug Administration.

Advertising of cancer cures is now illegal, but are the articles in the last two issues of *Picture Post* very different in effect from an elaborate form of advertisement for a secret remedy and Mr. Rees Evans?

We can but repeat what was written in these columns in 1908: "'Cancer curing' is to our mind the most execrable of all forms of quackery, for, in addition to the bitterness of disappointed hope, it inflicts an incalculable amount of unnecessary suffering."

[1] *British Medical Journal*, March 23, 1907.
[2] Ibid., December 5, 1908.

POLIOMYELITIS AND THE COMMUNITY

The risk of contracting poliomyelitis in its paralytic form is, even in a sharp epidemic, far less than it is popularly imagined to be. The publicity given to an outbreak is useful in at least one way, for it leads the doctor to consider poliomyelitis as a possible diagnosis even if the symptoms are not typical. The greatest contribution which the doctor in practice can make to the prevention of paralysis in the individual is to diagnose the disease early and secure rest for the patient. A reminder of the diagnostic signs and symptoms was given by Dr. W. H. Kelleher in a recent Refresher Course article.[1] After the diagnosis of poliomyelitis has been made in a member of a family or community the doctor is often asked for advice on problems which arise. He will probably find it difficult to answer some of these questions because of the lack of precise information about how the disease spreads, and it is worth recalling the facts which are known about its epidemiology.

Poliomyelitis is caused by one of a group of viruses, and infection is mainly spread from person to person. Occasionally the patient is known to have been in contact with another patient who developed paralysis, and the time from the known contact to the onset of symptoms is usually between 7 and 14 days, though it may be shorter or longer. Sometimes the contact has been with a person who had only a mild illness with no signs of involvement of the central nervous system, but more frequently the source of infection is a healthy person who has been in contact with a case or who has visited an area in which cases were occurring. In such instances the line of spread of infection can be seen, but in many others no such direct or indirect contact can be established. It sometimes appears that there has been indirect contact with two or more carriers intervening between cases, as when the fathers of two patients meet at work or brothers or sisters from two affected families attend the same class in

[1] *British Medical Journal*, 1950, **2**, 570.

school. Evidence of person-to-person spread is also provided by the frequent observation that cases occur successively in different parts of a town or village and show a centrifugal or radial spread from the first focus. Even these indications of the line of spread of infection are sometimes lacking, and it may be necessary to postulate a number of initial foci and a whole series of carriers between cases in order to justify the concept of person-to-person transmission. Virus studies have shown that the infection tends to be widely distributed, for many of those in close contact with patients excrete the virus in their stools, as do a smaller number who have been in more casual contact and a few who have had no known contact with a case. Epidemiological studies have often shown a patchy distribution of foci of high incidence with areas of diminishing incidence surrounding them, and scattered, apparently sporadic, cases in the rest of the area.

Outbreaks of poliomyelitis are usually fairly abrupt in onset: the majority of cases in a village or in part of a town where the incidence is high occur within four to six weeks. The spread of infection through the community is therefore quite rapid, and this also suggests a widespread carrier epidemic, since careful investigations as a rule yield no evidence of spread by mass contamination of food or drink. Spread by flies has been shown experimentally to be possible and may sometimes be the mode of infection, but person-to-person spread appears to be more important. The way in which infection is transferred has been the subject of debate between those who emphasize the importance of the presence of virus in the throat of carriers and of patients for a few days before and after the onset of symptoms and those who are impressed by the frequency with which the virus can be recovered from the stools of patients at the time of onset of illness and for four or more weeks afterwards. The conclusion to be drawn is that both pharyngeal secretions and faeces may be the source of infection, and that hands contaminated from either source may transmit infection either directly or indirectly. In a household where a case of poliomyelitis occurs it is therefore wise to assume that the other members, particularly children, are excreting the virus in their stools and to point out the need for careful personal hygiene. Some school medical officers recommend exclusion of brothers and sisters of a patient from a day school for three weeks, and "home and garden quarantine," or some approximation to it, of these children and of any pre-school children in the family may be advised. These precautions diminish the danger of spread from some sources of infection and are probably welcomed by other parents, but it is only in the early stages of an outbreak, before the virus is widespread, that they can appreciably diminish the total risk of infection in the community. No restrictions are usually placed on the adult members of a family in which a case of poliomyelitis occurs, except when a medical officer of health has to guard against special dangers in the case of food-handlers and those whose occupation brings them into close contact with children. Quarantine may be advised for children outside the family who have been in close contact with the patient at the time of onset of illness, but the activities of other casual contacts of a case are not restricted. During an epidemic it is sound practice to discourage gatherings of people (particularly of children) who do not normally meet, but there should be a bias in favour of allowing the normal activities of the community to continue.

Closure of day schools or day nurseries is called for only if it is clear that spread of infection is still occurring by contact of children who come from widely separated homes and so would not meet if they did not come to school. It is sometimes wiser, even in such circumstances, to keep the children in school rather than to free them to play with other younger children in or near their homes. The opening of day schools has been postponed where cases have been occurring at the end of the holidays and where the mixing in school of children from affected and unaffected areas seems likely to lead to further dissemination of infection. In a boarding school parents are usually notified if a single case of paralytic poliomyelitis occurs, and school life continues with precautions to prevent the spread of infection and to bring under medical observation any case of suspicious illness. When several cases occur the alarm of the school authorities and the anxiety of the parents may lead to school closure, especially if many parents decide to withdraw their children. Dispersal is of course attended by the risk of disseminating the infection in the homes to which the pupils go, and it disrupts the term's work. It is seldom possible to be confident that dispersal is justified on the grounds that it diminishes the risk of paralysis to individuals.

WIDENING HORIZONS OF MEDICINE

The unification of ideas has been long pursued, yet with an elusive quality shown in side-steps to diversity whenever the framework provided has seemed too rigid. One such unification was in the Middle Ages, when empire and papacy stood as twin symbols which between them covered all human activity. The barriers were broken at the Renaissance, if not before; and men such as Linacre for medicine, Newton (on his own pinnacle) for physics, and Boyle for chemistry set out in their own times and ways to follow their separate roads, freed in

varying degree from preconception but with a lack of specialization which now would seem surprising. Specialization has grown since and abundantly. Yet in an age in which the holder of a chair of anatomy can express embarrassment at being called upon to speak in a physiology lecture theatre there is also evident a contrary tendency towards unification which, being based on knowledge rather than preconception, may prove more enduring than its predecessors. Professor J. Z. Young[1] can see similarities between the operation of memory in brains and calculating machines, and draw surprise from neither physicist nor physiologist at a meeting of the Royal Society—unless that his own researches should have so far made progress. Equally it was possible for Sir Harold Hartley, a physical chemist by training, in his Presidential Address to the British Association[2] on the broad theme of energy and man's use of it, to glance in passing at the human machine and note that "life is dynamic, and the slender thread on which it hangs is that ceaseless flow of energy." With the same broad approach the difference between the rusting of iron and the resistance of the living organism to decay is that the one is not dynamic and the other is. The one sinks to the lowest energy level, sooner or later, with the remorselessness of the Greek Fates; the other is held above it like "a ball of celluloid poised on a jet of water," keeping its place and spin so long as energy is supplied to maintain it.

That this dependence on energy expenditure for maintenance is no fanciful generalization was illustrated in the section of physiology, also at the British Association, when Dr. R. B. Fisher discussed the lining layer of the intestinal mucosa as "the one barrier across which all ingested foodstuffs must pass before they enter the body fluids." The relevance of this contribution is that the mucosa is seemingly no inert membrane across which this or that material may pass, as in the classical demonstration of osmotic pressure—with water finding its way from a weaker solution to a stronger as of its own volition. The operation of the mucosal layer seems rather to be that of a chemical pump, with the energy for its working supplied by its own quick metabolism. Glucose can pass from lumen to tissue fluid against the gradient of concentration: so to an engineer might a wheel coast uphill impossibly, unless energy were provided to counter the gradient. So, too, do water and probably fat pass the mucosal boundary. With protein, the supreme necessity, it seems "eminently reasonable" that the first step in protein absorption should be the synthesis of mucosal protein, and the second the breakdown of this, with the breakdown products passing into the tissue fluids. Here, surely, is the pump that lifts the water over the hill, to run under gravity in the succeeding stage—as planned on transatlantic scale through the operation of the Grand Coulée Dam in the U.S.A.

So the horizons of medicine are widening, as from this or that vantage-point—hillock, perhaps, rather than hill—the surrounding territory can be surveyed. Another such has been quoted lately by Professor W. T. Astbury[3] from the knowledge, given largely by his own researches, of the structures characteristic of long-chain molecules. To see a resemblance between material of human weaving and the cell wall of an alga, viewed at 10,000 magnification, might at one time have seemed fanciful only—a resemblance no more illuminating than the microscopist's trick which transforms a sheet of reasonably smooth metal into a corrugated and jagged landscape. But if the underlying architecture is found to be common, if the strands of the algal weave are of the same kind as the component fibres of rayon thread, if the comparison can fairly be extended to range from natural proteins to synthetic plastics—then the laugh is with the *x*-ray physicist and electron microscopist, for Professor Astbury is both, and not with those who would see no more in such a resemblance than a conjuring trick of magnification. "In its material aspect," Astbury states, "life is more than anything else a manifestation of the physics and chemistry of chain molecules." It is a necessary reservation that by "material" is meant "structural" and all that structure implies, including the ability to change from one variant to another and back again, as was first shown by Astbury for wool fibres.

For the energetics of living organisms it is necessary to turn to those sciences which deal with energy considerations, as Sir Harold Hartley has graphically illustrated. To illuminate mechanisms it may be helpful in some connexions to look, with Professor Young, at the devices of the electronic engineer, although with the biologist's reservation that no calculating machine has yet been designed which is self-modifying in the light of experience. The principle remains good—that with the growth of knowledge in one field it becomes possible to see valid resemblances with events in others. In the two last of these examples the resemblance is experimental and liable to modification or qualification from further knowledge. In Sir Harold's it is fundamental, provided that the same answer as his is given to a question asked by Gilbert Lewis—whether in living organisms Nature obeyed her laws of energy. "This we may never know for certain, but the presumption is—she does." So when the mucosal layer of the intestine is found to act as a chemical pump, when the same deduction is reported, as lately by Dent and others,[4] of the role of the placenta in foetal nutrition, the response of the biochemist is to look with renewed interest for the mechanisms by which energy is made available—and the celluloid ball balanced, spinning, on the water-jet.

[1] *British Medical Journal*, 1950, **2**, 94.
[2] *Nature, Lond.*, 1950, **166**, 368.
[3] *Times Survey of the Progress of Science*, August, 1950, p. 3.
[4] *Biochem. J.*, 1950, **47**, 223.

SWEAT AND ADRENAL FUNCTION

During recent years advances in clinical endocrinology have been due largely to the development of more accurate methods for determining the activity of the patient's endocrine glands. Often only indirect methods are available—for example, the metabolism of radioactive iodine as an index of thyroid function—but in some instances the amount of hormone secreted by a particular gland can be measured by chemical or biological methods. The adrenal cortex secretes three main types of hormone, which are classified according to their chief physiological effect. Steroids with sex hormone activity can be measured by estimating the urinary excretion of 17-ketosteroids in the case of androgenic substances, and of oestrogens in the case of oestrogenic substances. Steroids which affect protein and carbohydrate metabolism can be measured by estimating the urinary excretion of 11-oxysteroids. An indirect method of assessing 11-oxysteroid production is to measure the fall in circulating eosinophils which normally occurs when the adrenal is stimulated by a test dose of A.C.T.H. or adrenaline. Other more indirect evidence of oxysteroid production may be obtained from the glucose- and the insulin-tolerance tests. The third main type of steroid secreted by the adrenal cortex is concerned with sodium, potassium, and chloride metabolism. An example of this type is the synthetically prepared desoxycorticosterone (D.C.A.). There is little evidence that this particular steroid is actually formed by the adrenal, but hormones which exert their main effect on electrolyte metabolism are often called the D.C.A.-like, desoxy-like, salt-active, or salt-retaining corticosteroids. At the present time no satisfactory chemical or biological method has been devised for measuring the urinary excretion of desoxy-like steroids. It is well known that many of the manifestations of Addison's disease are due to a deficiency of this type of hormone. The tests of Power and his colleagues[1-3] are used to reveal adrenal hypofunction, but they are influenced by a deficiency of other substances besides the D.C.A.-like hormone.

During the last few years Conn and his colleagues have reported a number of observations which suggest that the concentration of salt in the sweat bears a close relationship to the desoxy-like steroid production of the adrenals.[4 5] While studying the electrolyte metabolism of men subjected to humid heat, Conn confirmed previous findings that the concentration of salt in the sweat was reduced. Thus a man excreting 8 litres of sweat a day would lose 32 g. of salt before acclimatization, whereas he lost only 10–13 g. when fully acclimatized. This 60–70% reduction in salt loss from the skin was associated at first with a parallel conservation of salt by the kidneys; but the renal retention of salt was not sustained, whereas the excretion from the skin continued at a low level for as long as the subject remained in the heat. It seemed probable that this salt-conserving phenomenon was due to increased formation of D.C.A.-like hormone. The process of acclimatization was also associated with a negative nitrogen balance which persisted for 2–4 weeks and was independent of the nitrogen intake. This could be attributed to increased secretion of 11-oxysteroids. Thus Conn proposed that increased adrenal activity, as shown by a greater secretion of desoxy-like and 11-oxysteroids, was part of the process of acclimatization, and that the adrenals were stimulated by increased secretion of A.C.T.H. from the pituitary. He was able to show that injections of A.C.T.H. caused similar metabolic changes to those observed during acclimatization—namely, a reduction in the salt content of the sweat and a negative nitrogen balance. Injections of D.C.A. also reduced the salt content of the sweat, but as would be expected there was no disturbance of nitrogen metabolism.[6 7]

Conn then turned to pathological conditions in which there was a disturbance of adrenal function.[8] In Addison's disease the salt content of the sweat was greatly increased above the values found in normal subjects. Two patients with chronic adrenal insufficiency had 105 milliequivalents of chloride per litre of sweat, whereas the range in controls was 15–60 mEq. per litre. Treatment with D.C.A. reduced the salt loss nearly to normal. In three patients with panhypopituitarism the values were 70–75 mEq. per litre, indicating a deficiency of D.C.A.-like steroids not as great as in Addison's disease. In patients with Cushing's syndrome, whether associated with adrenal carcinoma or hyperplasia, increased steroid production was shown by a marked reduction in the salt content of the sweat. These studies indicate that the salt content of sweat collected under standard conditions may prove a reliable index of endogenous salt-active corticosteroid production. Unfortunately the collection of samples of sweat under conditions in which the body is exposed for two hours to a temperature of 95° F. (35° C.) and a relative humidity of 90% is not a practical proposition. Perhaps the originators of this sweat test will be able to evolve a method more suitable for use in the clinical laboratory.

[1] Robinson, F. J., Power, M. H., and Kepler, E. J., *Proc. Mayo Clin.*, 1941, **16**, 577.
[2] Levy, M. S., Power, M. H., and Kepler, E. J., *J. clin. Endocrinol.*, 1946, **6**, 607.
[3] Cutler, H. H., Power, M. H., and Wilder, R. M., *J. Amer. med. Ass.*, 1938, **111**, 117.
[4] *J. clin. Endocrinol.*, 1950, **10**, 12.
[5] *J. clin. Invest.*, 1948, **27**, 529.
[6] Ibid., 1946, **25**, 912.
[7] *Advances in Internal Medicine*, 1949, London, vol. 3, p. 373.
[8] *Arch. intern. Med.*, 1949, **83**, 416.

ELECTROENCEPHALOGRAPHIC CONTROL OF ANAESTHESIA

The effect of anaesthetic drugs on the output of electrical energy by the brain cortex has been studied by Bickford[1] in the laboratory of electroencephalography at the Mayo Foundation. He found a constant relationship between the depth of anaesthesia and the output of electrical energy, and was able to devise an apparatus for the automatic electroencephalographic control of dosage in general anaesthesia. The fluctuating brain potentials are amplified and made to charge a condenser, the rate of charge being proportional to the number and amplitude of the waves in a given time. At a predetermined voltage the condenser discharges, actuating a relay which pushes forward by a small amount the plunger of a syringe delivering thiopentone or any other anaesthetic agent into the patient's vein or into a vaporizer. The rate of injection is therefore dependent on the amount of cerebral electrical activity, and anaesthesia can be steadily maintained at a depth which may be varied by controlling the gain of the amplifier.

The device has been used for barbiturate and ether anaesthesia in the rabbit, cat, and monkey and also in man.

[1] *Electroenceph clin. Neurophysiol*, 1950, **2**, 93.

Anaesthesia has been maintained automatically in animals "on many occasions . . . for periods as long as two or three days without any readjustment of the circuit controls." Bickford stated that a modified version of the apparatus adapted for the prolonged administration of ether to human patients has been used successfully in the operating theatre, and he proposes to publish later a full description of the technique.

SYPHILIS AND YAWS IN HAITI

Haiti, or Hispaniola as it was formerly known, looms large in the history of syphilis, for it was to or from this island, or perhaps both, that Christopher Columbus and his men conveyed syphilis on their return to Spain at the end of the fifteenth century. Both syphilis and gonorrhoea are common among the Haitians, affecting perhaps 25% of the population, but it is yaws—a para-venereal disease closely akin to syphilis, which is said to have an incidence of 85% among all the inhabitants and 75% among children under 15 years of age—which causes the greatest amount of disability; this it does by attacking mainly the skin and bones. An ambitious scheme to eradicate all three diseases from the island is under way, sponsored by the World Health Organization and the United Nations International Children's Emergency Fund.[1] Fortunately penicillin is effective against all these diseases, so that theoretically it should be possible to eliminate them within the two years allotted. There are, however, several practical difficulties: the cost will be high, but Unicef is putting up 320,000 dollars for the purchase of supplies and the Haitian government will provide 290,000 dollars a year for running expenses. The area to be covered is large—10,714 square miles—and many of the 3½ million inhabitants live in out-of-the-way places, some of which doctors will be able to reach only by travelling on foot or horseback. It may be difficult to impress the more backward and illiterate inhabitants with the objects of the campaign, but the help of local newspapers, police, and priests is being sought, and it is believed that the population will co-operate, particularly when they see the almost magical results of treatment. For administrative purposes the island will be divided into geographical areas, and 10 mobile treatment units, consisting of teams of four travelling in "jeeps," will each be allotted an area. The physicians will mostly come from other countries, since there are only about 300 medical practitioners on the island, and only 26 to look after the rural population of 2½ millions,[2] but the auxiliary staff will mainly be Haitians. The campaign will be carried out in three stages: mass diagnosis and treatment; establishment of permanent treatment dispensaries at strategic points from which mobile squads will work so as to reach all areas; and the organization of a system of case-finding and home-treatment. The proposal is to give two doses of penicillin separated by an interval of 10 or 12 hours. Whether this will bring about biological cure in anything approaching 100% of cases remains to be seen, but it should at least render patients non-contagious.

The undertaking is an immense one, probably the largest anti-venereal-disease campaign ever launched. The results may be expected to be good, but history has few if any records of a widespread disease being completely eradicated by treatment alone. Nevertheless, this project offers a valuable opportunity to study a disease such as yaws, about which so little is known. Specimens of the causative organism are to be sent to Professor T. B. Turner at the Johns Hopkins Hospital at Baltimore, so that the relationship between *Treponema pertenue* and *Treponema pallidum*—the causative organisms of yaws and syphilis respectively—can be examined. Hitherto these two organisms have been morphologically indistinguishable, but it may be that their immunological reactions differ. Perhaps an answer will at last be found to the question, "Are yaws and syphilis two diseases or one?"

[1] Guthe, T., *J. Soc. Hyg.*, 1950, **38**, 6.
[2] *Chron. World Hlth Org.*, 1950, **4**, 87.

THE DOCTOR AS A PUBLIC SPEAKER

One accomplishment which the prospective doctor should seek after, and which need not add to the burden of the curriculum, is the ability to speak in public—to give clear and succinct expression to his ideas in a company of his fellows. He will probably find it easiest to acquire this ability in a debating society or similar body, for it is more a matter of cultivation than of natural endowment. The level of public speaking in the medical profession is lower than in the professions of law and teaching and in the Church and the Civil Service. It is below the level which used to obtain in medical societies, whose old members, accustomed as they were to deliberate speech, with a slight polish on it, would be aghast at the slovenliness prevailing to-day. There are outstanding exceptions, but in general the standard of speaking in medical assemblies—scientific, business, or social—has deteriorated. Discussions are casual and conversational, speech is slipshod, articulation is disregarded. It is a refreshment to find a speaker who has not only something to say but a way of saying it, a sense of phrase and structure, with sentences that do not lose their way in parenthesis.

In Plutarch's *Lives* it is told of Demosthenes that he claimed he was a good member of the democratic State because he always came prepared to the rostrum; he held that such preparation was a mark of respect to the people he addressed. The medical profession does not need a Demosthenes; but some preparation before speaking, some attention to form, is, after all, a courtesy to the audience, as well as a way of impressing the speaker's ideas not only upon others but upon his own mind. This is not the unimportant frill that some may suppose. The doctor, especially in a small community, will probably be called upon to take a lead in public affairs, which will bring him occasionally to the platform. He may also be expected to take a part in the meetings of his profession, and the ability to put his points so that they can be comprehended by the slower-witted and the partially deaf will be a recommendation. From time to time he will go into the witness-box, and in court a habit of clear statement will serve him well. It is the young doctors and research workers, full of knowledge of their subject, who should be particularly on guard against incoherence. Some of the older men, brought up in a different tradition, are less prone to be glib and diffuse—both more audible and more comprehensible. Their example is one which the eager young speaker should follow.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

CHEMOTHERAPY—III. STREPTOMYCIN

BY

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Streptomycin was the first successful product of the world-wide search for further antibiotics with chemotherapeutic powers following the demonstration of these properties in penicillin. It is formed by a soil fungus, *Streptomyces griseus*, and is of more complex chemical structure than penicillin. It is basic in nature, and the compounds which have been used in therapeutics are the hydrochloride, sulphate, and calcium chloride complex. More recently a slightly modified form, dihydrostreptomycin, has been introduced, for which it is claimed that toxic effects are less often produced when administration has to be prolonged.

Administration

When streptomycin is given by mouth its behaviour is entirely different from that of penicillin: it is not destroyed, but neither is it absorbed. Hence this route is indicated only in order to produce an effect in the intestinal tract itself. To obtain a systemic effect, streptomycin must be given, like penicillin, by intramuscular injection. Absorption after injection is somewhat slower, as also is excretion: following a single full dose—for example, of 1 g.—the drug can be detected in the blood for eight hours or more. It reaches all important areas in the body except the cerebrospinal fluid; like penicillin, it has to be injected intrathecally for the treatment of meningitis. It is excreted by the kidney, and thus attains a high concentration in the urine.

Dosage varies within much narrower limits than that of penicillin, because streptomycin is by no means free from toxicity. A daily dose of 4 g. has rarely been exceeded, and for long-continued treatment it is now more commonly 1 g. How many doses are given daily depends on the condition being treated. Tuberculosis is a special case, since a single daily dose (or injections at even longer intervals than one day) is used in treating this disease. On the other hand, the short-term treatment of an acute infection is usually accomplished by giving two, three, or four daily doses. It cannot be said that the best system for this kind of purpose has yet been defined by any deliberate comparison.

Mode of Action

Streptomycin is actively bactericidal. There is no optimum concentration for this effect, as with penicillin: the higher the concentration, the more rapidly are bacteria killed. The equivalent of that attainable in the urine will in a nutritive medium *in vitro* markedly reduce a susceptible bacterial population in a few minutes and extinguish it within an hour. The lower concentrations reached in the blood and tissues cannot act so rapidly, but there is no reason to assume any qualitative difference in the effects produced there.

If this were all that need be said about the action of streptomycin on bacteria, it would be a most remarkable drug and much more regularly successful than in fact it actually is. Its disadvantage is that bacteria can acquire a high degree of resistance to it with extraordinary rapidity. This is of such a degree that further treatment is futile, and it has often been observed within 24 hours of the beginning of treatment, though its appearance may be delayed rather longer than this. The change is also permanent. It follows that in many cases only a single course of treatment can be given: either this succeeds, the infection being totally eradicated, or further treatment is precluded by acquired bacterial resistance. This is sometimes accompanied by "dependence"—the existence in the bacterial population of some cells which actually utilize streptomycin as a nutrient and cannot grow without it.

A sensible conclusion from these facts would seem to be that treatment should be brief and vigorous, allowing the least possible opportunity for bacterial recovery. This policy would require that the drug concentration in the blood and tissues be well maintained, and thus would call for frequent administration.

The time needed for tubercle bacilli to acquire resistance corresponds with their much slower growth, and is at least five weeks. Systems of dosage different from those applicable in other conditions have been found advisable for treating tuberculosis.

Toxic Effects

In patients with impaired renal function, streptomycin may accumulate in the body and has occasionally thus caused death. The only serious common toxic effect is on the eighth nerve, vestibular disturbances (vertigo and incoordination) being produced first, and deafness in more severe cases. Either effect may be permanent, but some degree of recovery occurs in more mildly affected patients.

These changes are never produced by any ordinary doses given only for a short period, such as a week. They are the product of long-term treatment, and their frequency and severity are then directly proportional to the dose: if this does not exceed 20 mg. per kg. daily no permanent damage will result. Intrathecal injections are particularly apt to have these effects. It is claimed for dihydrostreptomycin that it is much less apt to produce them, but this claim has not been fully borne out in recent experience.

Indications

Penicillin being the perfect chemotherapeutic agent, there is no need for any other except in infections insensitive to it. There are unfortunately many such, but each new discovery is effective against some of them. Streptomycin began this process by subtracting from the list infections due to the tubercle bacillus and to a number of Gram-negative bacilli. A satisfactory table of species classified according to their sensitivity to streptomycin cannot be prepared because strain variation in sensitivity is so marked. It must suffice to say that *Mycobacterium tuberculosis*, unless it has had previous contact with streptomycin, is uniformly and highly sensitive, being inhibited by not more than 0.2 μg. per ml.; that almost all species of Gram-negative bacilli are also sensitive, but to concentrations varying from as little as 0.1 to as much as 25 μg. per ml. or more; and that most penicillin-sensitive organisms, such as streptococci and staphylococci, are usually also sensitive to streptomycin, though to a less degree.

The main clinical indications for streptomycin are therefore tuberculosis, various infections due to Gram-negative

bacilli, and occasionally coccal infections if they are abnormally penicillin-resistant. The latter are usually much better controlled by "aureomycin," if this is obtainable.

Tuberculosis

This is no place to discuss in detail the indications for streptomycin in various forms of this disease or the systems of dosage advisable. At the risk of seeming to belittle the functions of general practice, it has to be said that the decision to undertake this treatment is one in which the expert should usually have a say, while the conduct of the treatment itself may be difficult outside a hospital or sanatorium.

Streptomycin is of course imperatively indicated in otherwise fatal forms of the disease—in miliary tuberculosis and meningitis. It has been strikingly successful in rapidly extending lung infections and in ulcerative tracheobronchitis. Its place in the treatment of more chronic disease, whether of the lung or elsewhere, is much more dependent on the features of the individual case and on the possibilities of combined surgical treatment.

Tubercle bacilli cannot be successfully attacked either in a cavity in the lung or in a large caseous focus in, for example, the kidney. There is thus no prospect of eliminating the infection in patients with such lesions. The only effect will be to limit extension while treatment continues, and to deal with bacilli in smaller and more accessible foci. This may be valuable if surgery is undertaken at the same time, and particularly if it is necessary in order to render surgery feasible. On the other hand, to rely solely on streptomycin in a case of chronic pulmonary tuberculosis with cavitation is expecting altogether too much of the drug, and will rarely produce any ultimate benefit.

Indiscriminate treatment may be positively harmful, not only to the patient but to others, because its effect is usually to make the bacillus resistant to the drug. This means that streptomycin will be useless in any subsequent acute exacerbation, and in treating the disease in anyone else who may acquire it from this patient. The danger of breeding and spreading streptomycin-resistant strains of tubercle bacilli is a very real one, and disastrous instances of its results have already been seen in the U.S.A. American studies have made it clear that cavitation is a major factor in promoting acquired bacillary resistance in treated patients. Fortunately combined treatment with *p*-aminosalicylic acid (given orally at the rate of 12 g. daily) diminishes the frequency of acquired resistance as well as reinforcing the action of streptomycin on the tubercle bacillus.

Plague and Tularaemia

It may be that in years to come these will be the only diseases for which streptomycin is used. Both are derived from wild-animal reservoirs in which the micro-organism has no chance of acquiring resistance to the drug, and in both it is strikingly successful. In pneumonic as well as bubonic plague streptomycin has been found curative, and in tularaemia, even in its more severe forms, all reports are agreed that the effect is immediate and invariable. These are in fact the two specific diseases in which the drug has had its greatest success, and we should not forget that there are some parts of the world in which to possess an effective treatment for plague constitutes a therapeutic advance of the first order.

Septicaemia

The forms of septicaemia in which streptomycin is principally indicated are those due to Gram-negative bacilli of coliform type—usually *Bacterium coli* itself, *Proteus vulgaris*, or *Pseudomonas pyocyanea*—and seen as complications of severe urinary-tract infection, middle-ear disease, wound sepsis, and lesions of the intestinal tract. It is important to determine the sensitivity of the organism to the drug, since if this is subnormal another antibiotic such as "chloromycetin" may be indicated. Full and frequent doses (1 g. three or four times a day) are required until the generalized infection has been overcome.

Meningitis

There are several kinds of meningitis in which Gram-negative bacilli are concerned for which streptomycin is strongly indicated. One is the spontaneous form occurring in young infants and due to *Bact. coli* or sometimes to a species of *Salmonella*. In *Haemophilus influenzae* meningitis, usually seen at a later stage of infancy, streptomycin should also be used, but sulphadiazine and immune serum may be advisable in addition. Thirdly, *Ps. pyocyanea*, *Proteus vulgaris*, or other coliform bacilli may cause meningitis complicating trauma or otitis media, or resulting from contamination of materials used in operative procedures on the central nervous system; the meningitis which has unfortunately followed spinal anaesthesia or even simple lumbar puncture is an example.

Streptomycin should be given intrathecally as well as intramuscularly: the full daily dose by this route is 100 mg. for an adult. Here again not only the initial but subsequent tests of sensitivity (if cultures continue to yield growth) should be carried out, and one of the newer antibiotics substituted if resistance develops.

Urinary-tract Infections

Streptomycin is the most potent of all urinary antiseptics, with a wide range of activity. Properly used, it will often succeed, even in long-standing infections, when everything else has failed. There are three main conditions which must be satisfied in order to ensure a good prospect of success. First, any underlying predisposing cause must if possible be removed; in the presence of obstruction or calculi only temporary benefit, if any, can be expected.

Secondly, it must be determined by cultivation of a properly collected fresh specimen of urine and by sensitivity tests of the organisms found that streptomycin is the right drug to use. If a staphylococcus, a streptococcus, or even *Proteus vulgaris* is found, penicillin is likely to be preferable. On the other hand, *Bact. coli*, *Bact. aerogenes*, *Ps. pyocyanea*, and various paracolon bacilli, which should normally be more or less sensitive to streptomycin, are nowadays sometimes found to be completely resistant. This is often the consequence of previous treatment, but is now beginning to be seen in patients who have never had the drug, and must therefore be attributed to the dissemination of resistant strains from other treated persons, a development which has long been foreseen and which must tend steadily to restrict the field of usefulness of streptomycin.

When treatment has been decided on, the third condition to secure is alkalinity of the urine, since the drug possesses little activity in an acid medium. Unless the infection is due to a urea-fermenting organism, when of course the urine will be persistently alkaline owing to the formation of ammonia, it may be necessary to give 2 g. of sodium bicarbonate four times a day for one or two days before this condition is secured. The specimen tested should be that passed on waking in the morning, and not until this is at least neutral to litmus, if not frankly alkaline, should

streptomycin be given. The object is then to maintain a high concentration in the urine for the short period required to sterilize it, and theoretically three or more doses daily are advisable: two have been used with success, but one only is inadequate. A dose of 0.5 g. three times a day or of 1 g. twice a day will usually suffice, though more vigorous treatment is safer and can do no harm in the short period necessary.

Sterility in successful cases is achieved in less than 24 hours, and it is useless to continue for more than three days: to what extent the period of treatment can be shortened further without risk of failure is not yet known, but in my own experience patients have been cured of long-standing infections by only three and four 0.5-g. doses. If the organism persists it will usually be found to have acquired a high degree of resistance, precluding any further treatment with this drug.

Intestinal Infections

Streptomycin given by mouth—for example, in 1-g. doses four times a day—is of value in bacillary dysentery and in acute salmonella enteritis, although, unfortunately, it does not seem to diminish the liability to subsequent persistence of a carrier state. Its usefulness in infantile gastro-enteritis is a subject of dispute, possibly because there are varieties of this condition, some of its imperfectly known causes being streptomycin-sensitive and others not. Despite its *in vitro* activity against *Salmonella typhi*, the drug is practically useless in enteric fever, for reasons which are still obscure. It may be used either alone or together with sulphasuxidine to disinfect the bowel preparatory to operations on the colon: administration should not be begun more than two days before operation, since otherwise resistance may have been acquired before this takes place.

It may be added here that streptomycin and other antibiotics have been successfully used in peritonitis. It is exceedingly difficult on the available evidence to decide what their effect is, and which is likely to be most useful in any given case, but owing to its wider range of activity, including many intestinal species (with the notable exception of the clostridia), streptomycin is at least theoretically preferable to penicillin.

Lung Infections

A strong indication for streptomycin has been pneumonia due to *Bact. friedländeri* or *H. influenzae*. How far it should be replaced by the newer antibiotics for this purpose is not yet clear. More chronic lung and bronchial infections due to these and similar organisms may also be treated, but the benefit is likely to be only temporary if there are underlying structural changes, as in bronchiectasis. The value of the drug in whooping-cough is doubtful.

Local Application

Like penicillin, streptomycin can also be applied locally in a number of ways. It has been administered by inhalation for infections of the bronchial tree. It can be employed in the same way as penicillin for infections of the conjunctiva, cornea, and the interior of the eye itself. The instillation of a solution is useful in the treatment of otitis externa and otitis media when Gram-negative bacilli such as *Proteus vulgaris* and *Ps. pyocyanea* are concerned. The same organisms can rapidly be eliminated from superficial wounds, burns, and such lesions as varicose ulcers by spraying a solution or the application of dressings wet with it, if these operations and the general aseptic management of the case are conducted with care and skill.

Only a short period of application should be necessary for such purposes. It has to be remembered that repeated contact with streptomycin over a period of some weeks leads to sensitization. This has been seen frequently in nurses handling the drug, who develop erythematous and oedematous lesions of the face and hands. It should be possible by careful technique to avoid such contact in making up and administering doses, but once the condition is established there is no remedy but avoidance of any further dealings with the drug.

INTERNATIONAL SOCIETY OF HAEMATOLOGY

MEETING IN CAMBRIDGE

The third congress of the International Society of Haematology was held in Cambridge under the presidency of Sir Lionel Whitby from August 21 to 26. Some 500 delegates attended from many parts of the world, and nearly 200 papers were read during the conference, grouped under the four headings, anaemia, leukaemia, problems of coagulation, and immunohaematology.

The social events included a reception by the president on Monday, August 21, and the society's dinner on Wednesday, August 23, at which it was announced that Dr. A. Pavlovsky, of Argentina, would be president for the next congress. A reception was also held by the vice-chancellor in Pembroke College on Tuesday, August 22, and garden parties were given by Captain R. G. Briscoe, Lord Lieutenant of the county, at Longstowe Hall, and by Sir Lionel Whitby in the grounds of Downing College.

A number of delegates showed scientific exhibits, and several commercial firms displayed products of interest to haematologists. Films were shown and a demonstration of colour television microscopy was given by Messrs. W. G. Pye and Co., Ltd.

Anaemia

The first meeting on this subject was devoted to therapy, and Dr. E. LESTER SMITH (England) opened with a paper describing the isolation and properties of vitamin B_{12}. The effect of its oral administration in pernicious anaemia in the absence of known sources of intrinsic factor was then discussed by Dr. E. H. MORGAN *et al.* (U.S.A.), and Dr. GRACE GOLDSMITH (U.S.A.) described the effects of vitamin B_{12} given orally and parenterally and of a concentrate of intrinsic factor in macrocytic anaemia. Other contributions concerned the therapeutic effect of vitamin B_{12} obtained from a variety of new sources, the use of the vitamin in the treatment of tropical macrocytic anaemia, and the effect of cobalt therapy in various anaemias. A further session on pernicious anaemia and vitamin B_{12} was opened by Dr. O. P. JONES (U.S.A.), who described the action of anti-anaemic substances on embryonic prehepatic erythropoiesis. Dr. G. LARSEN (Norway), describing the pathogenesis of the macrocyte, pointed out that even in adequately treated pernicious anaemia macrocytes occur in the peripheral blood. These cells have a normal mean corpuscular volume, but their thickness is about half normal. Their life-span is about 40 to 60 days, and they are more resistant than normal cells to hypotonic saline. Experiments were described which suggested that there may be alterations in the haemoglobin of these macrocytes, with a failure of normal haemoglobin maturation. Drs. J. MOSBECH and A. VIDEBAEK (Denmark) presented the results of an investigation, with adequate controls, into the prognosis in 301 cases of pernicious anaemia (see *Journal*, August 12, p. 390). Further papers and discussions centred on the question of whether vitamin B_{12} alone was a fully adequate haemotherapeutic agent in pernicious anaemia. Experimental work on the megaloblast problem and the maturation of erythroblasts was discussed by Drs. G. ASTALDI (Italy), D. DANTCHEV (Bulgaria), and P. COLOMBO (Italy).

On August 25 a session was devoted to nutritional factors in anaemia when Dr. C. R. DAS GUPTA (India) discussed the aetiology of nutritional macrocytic anaemia. Drs. V. KAMALINGASWAMI and H. M. SINCLAIR (England) spoke on the aetiology and pathogenesis of polycythaemia in pyridoxin deficiency in the rat, and Dr. J. F. RINEHART *et al.* (U.S.A.) gave an account of experimental pyridoxin deficiency in the rhesus monkey. The action of folic acid, liver extracts, vitamin B_{12}, and other substances with anti-anaemic properties were described by Drs. A. ASCHKENASY (France), L. TENTORI and G. VIVALDI (Italy), O. CARERE-COMES (Italy), and G. SOTGIU and C. CACCIARI (Italy). Drs. A. R. AXELROD and L. BERMAN (U.S.A.) presented their findings in the bone marrow in hypo- and hyperthyroidism. The incidence of lymphocytes in bone marrow in hyperthyroidism may reach levels comparable to chronic lymphatic leukaemia with no peripheral lymphocytosis.

A session on haemoglobin metabolism was opened by Drs. C. V. MOORE and R. DUBACH (U.S.A.), who discussed radioactive iron studies in the understanding of iron metabolism. Further papers were devoted to the action of vitamin B_{12}, folic acid, and liver extracts on the synthesis of protoporphyrins (Dr. A. GAJDOS, France), the role of nuclear functions in the synthesis of ribose-nucleic acid and the formation of haemoglobin in erythroblasts (Dr. I. G. GUZMAN, Mexico), the metabolism of haemoglobin, porphyrin, and bile pigment (Dr. I. M. LONDON, U.S.A.), the interrelationship of red cell stroma and haemoglobin production in the normal and anaemic-hypoproteinaemic dog (Dr. G. H. TISHKOFF *et al.*, U.S.A.), and the fate of transfused red cells tagged with radioactive iron (Dr. L. E. HUMMEL *et al.*, U.S.A.).

An interesting session on hypersplenism was opened by Drs. T. S. EVANS and C. A. DOAN (U.S.A.), who described haemolytic crises of acquired hypersplenism in the course of giant follicle lymphoma. The secondarily enlarged spleen which may develop during the course of this normally long and rather benign disease can and should be removed by splenectomy. The results of splenectomy in cases of leukaemia with haemolytic anaemia were described by Drs. P. S. HAGEN and C. J. WATSON (U.S.A.), who demonstrated the very considerable fall in transfusion requirements in such patients after splenectomy.

Further excellent papers from Sweden, Denmark, Holland, Greece, and Austria demonstrated the very widespread interest in the problem of hypersplenism.

Dr. W. DAMESHEK (U.S.A.) gave the first paper in a session devoted to haemolytic anaemia. He analysed the possible mechanism of auto-immunization in acquired haemolytic anaemia and discussed the rationale of therapy with A.C.T.H. and splenectomy. Further contributions dealt with the role of the spleen in familial spherocytosis (Dr. C. A. A. SCHRUMPF, Norway), photo-electric study of permeability and lysis of red blood corpuscles in anaemia (Dr. P. MOSER, Germany), and Rh antibodies in haemolytic anaemia (Dr. E. WITEBSKY, U.S.A.). The pathogenesis of the haemolytic crisis and the effect of dicoumarol on the course of the disease were discussed by Dr. W. H. CROSBY *et al.* (U.S.A.).

Leukaemia

Leukaemia due to benzine, one of the rare human leukaemias of which the cause is known, was the subject of papers by Dr. J. BERNARD (France) and by Dr. L. BRAIER (Argentina). The cytology of acute leukaemias, unusual types of leukaemia in children, the possibility of a virus in the aetiology with some supporting experimental work, and the significance of leukaemic plasma in cytogenesis were also discussed. During the next session, devoted to leukaemia and related diseases, Drs. SHIMKIN and S. R. METTIER (U.S.A.) analysed the mortality and longevity statistics for myelocytic leukaemia. Dr. M. MORRISON *et al.* (U.S.A.) described a rare type of leukaemia showing dwarf cells, and Drs. G. DI GUGLIELMO and E. STORTI (Italy) presented some interesting observations on erythromyelosis in the fowl and man. Dr. S. MOESCHLIN (Switzerland), who was convinced of the neoplastic nature of Hodgkin cells, advised that this condition should be regarded as a malignant tumour and recommended radical excision of affected lymph glands.

The first of two sessions on treatment dealt mainly with the use of A.C.T.H. and cortisone therapy. Papers were read by Drs. J. M. STICKNEY *et al.* (U.S.A.), R. H. SAUNDERS *et al.* (U.S.A.), and A. VIDEBAEK (Denmark). These authors, and those who took part in the discussion, agreed that, while striking haematological remissions could be produced in many cases of lymphatic leukaemia, the improvement was transitory and often accompanied by a distressing type of obesity. The principles which should govern titrated, regularly spaced radioactive phosphorus, or spray *x*-ray therapy, were dealt with by Dr. E. E. OSGOOD (U.S.A.), and Dr. P. BJERRE-HANSEN (Denmark) described his clinical experience with urethane.

The second session was opened by Dr. F. H. BETHELL *et al.* (U.S.A.), who discussed the metabolism of folic acid in leukaemic patients. Aminopterin in the treatment of leukaemia (Dr. J. INNES, Scotland), urethane in the treatment of multiple myeloma (Drs. W. C. MOLONEY and W. J. HARRINGTON (U.S.A.), and clinical and experimental observations on the action of urethane (Dr. C. MALAGUZZI-VALERI, Italy) were also discussed. Dr. A. PAVLOVSKY and Dr. G. C. VILASECA (Argentina) recorded their results in acute leukaemia with radioactive phosphorus, and Dr. H. R. BIERMAN *et al.* (U.S.A.) described the disappearance of leukaemic cells transfused into non-leukaemic recipients. The treatment of acute leukaemia with blood transfusion and antibiotics was the subject of a paper by Dr. L. M. MEYER (U.S.A.).

A session on aetiology was opened by Dr. J. HOOGSTRATEN (Canada), who compared the characteristics of leukaemia and neoplasia and concluded that the neoplastic nature of leukaemia must be regarded with some scepticism. Dr. J. C. WHITE *et al.* (England) presented the results of quantitative studies on the content of nucleic acid in normal leukaemic cells from blood and bone marrow. There was a tendency towards high ribose, nucleic acid, phosphorus values in leukaemia where primitive cells predominate. The cytochemistry of leukaemia (Dr. W. LAVES, Germany), the cytochemistry of leukaemic chromosomes (Dr. E. E. POLLI, Italy), and the significance of pathological polyploidy in leukaemia (Dr. E. UNDRITZ, Switzerland) were also discussed.

A session on experimental observations was opened by Dr. J. BICHEL (Denmark), who described tissue culture of leukaemic cells. The effects of folic acid antagonists on leukaemic and blood-forming cells were dealt with by Dr. U. HAENEL (Switzerland) and Dr. W. JACOBSON (England). Dr. P. BASTRUP-MADSEN (Denmark) discussed the action of adenine antagonists on living cells *in vitro*. Dr. A. FIESCHI (Italy) described his tissue culture experiments with leukaemic cells, and Dr. R. H. GIRDWOOD (Scotland) presented evidence that 4-amino-pteroylglutamic acid had an action other than that of a folic acid antagonist.

In a session on special types of leukaemia a case of acute erythraemic myelosis was discussed by Dr. E. NEUMARK (England), and several other papers were read on erythroleukaemia, plasma cell leukaemia, histoleukaemia, and the relationship between lymphatic leukaemia and lymphosarcoma.

Problems of Coagulation

The first session here was opened by Dr. F. J. LEIBETSEDER (Austria), who discussed the effect of adrenaline and dihydroergotamine on the first stage of coagulation. Drs. R. BREDA and R. BERNARDI (Italy) described a condition present in two brothers belonging to a family affected with hereditary haemorrhagic telangiectasia who showed a prolongation of prothrombin time. Experiments conducted with plasma from these cases suggested the possibility of an anti-prothrombin-conversion factor. Drs. K. N. KAULLA (Switzerland) and V. D. BORI (Italy) described the coumarin treatment of experimental thrombosis. The correlation between deficiencies or increases of blood-clotting factors and dysproteinaemias was described by Dr. P. DE NICOLA (Italy). The clinical and haematological problem of thrombophilia (Drs. A. MARMONT and A. PALMIERI,

Italy), the present status of the thrombopathies (Dr. N. QUATTRIN, Italy), and a case of haemophilia-like disease due to the presence of circulating anticoagulants (Drs. M. CRISALLI and G. COTELLESSA, Italy) were the subjects of further papers presented.

A session was devoted to the role of the liver, and papers were read by Dr. CROSBY for Dr. M. STEFANINI (U.S.A.) on the haemorrhagic diathesis of liver dysfunction; by Drs. P. NOLF and M. ADANT (Belgium) on the function of the liver in blood coagulation; by Dr. W. RIEBEN (Switzerland) on the coagulo-hepatogram, which presented a measurement of ac-globulin, prothrombin, and natural plasma-antithrombin, all predominantly formed in the liver, and Dr. P. MENEGHINI (Italy), who discussed the occurrence and significance of mast cells in haemorrhagic conditions.

A stimulating session on physiology was opened by Dr. P. A. OWREN (Norway). He discussed the prothrombin-activating complex and its clinical significance, and introduced new terminology for various coagulation factors. Other papers in this session were read by Dr. W. H. SEEGERS (U.S.A.) on "Studies on Purified Prothrombin," Dr. K. JACOBSON (Sweden) on "Plasminogen," Drs. P. CAZEL and IZARN (France) on "Rapid Neutralization of Thrombin after Coagulation," and Dr. L. LORAND (England) on "Contributions to the Fibrinogen–Fibrin Problem."

A session devoted to haemophilia was opened by Drs. R. G. MACFARLANE and R. BIGGS (England), who described studies on the coagulation of haemophilic blood. Their experience suggested that the abnormally slow speed of thrombin formation in haemophilic blood may be due to its insensitivity to added thromboplastin. Several further papers were read on experimental and clinical observations in haemophilia in man and dog.

During a session on purpura several papers were read on the cytology, physiology, and pathology of platelets and factors involved in capillary function. An interesting communication by Dr. E. L. LOZNER *et al.* (U.S.A.) concerned the endocrine aspect of thrombocytopenic purpura, and the evidence presented strongly suggested that oestrogenic substances were concerned with the development of this disease in adults.

A later discussion on anticoagulants concerned principally the mode of action of dicoumarol, water-soluble polyamino acids, and heparin.

Immuno-haematology

In the first meeting devoted to immunology papers were read by Dr. L. BERMAN *et al.* (U.S.A.) on the so-called "Lupus Erythematosus Inclusion Phenomenon," and by Drs. A. D. CAJANO and C. MAUREA (Italy) on anti-cellular and anti-organ sera. The latter authors immunized rabbits against guinea-pig leucocytes, bone marrow, and spleen, and were able to show that the antisera obtained had not only species-specificity but also organ-specificity.

The present position of blood groups was reviewed briefly by Dr. J. VAN LOGHEM (Holland). Drs. M. CUTBUSH and P. L. MOLLISON (England) gave an account of the Duffy blood-group system. Dr. A. E. MOURANT (England) described the distribution of blood groups in relation to transfusion organization, and Dr. G. FULTON ROBERTS (England) discussed the prozone inhibition which some anti-globulin sera show when tested against weakly sensitized cells.

The next session was opened by Dr. A. S. WIENER (U.S.A.), who described with illustrative cases the medico-legal application of the rhesus blood types. Dr. P. LEVINE (U.S.A.) summarized the position of the Kell–Cellano system of blood factors, and Drs. R. R. RACE and R. SANGER (England) described a blood lacking any detectable representative of the C and E series of allelomorphic antigens. This case represents a probable deletion in a human Rh chromosome and supports the separability of the C, E, and D genes. A notable paper was presented by Dr. S. FILITTI-WURMSER *et al.* (France) on the differentiation of "A" blood groups by their agglutinins.

Dr. L. E. YOUNG *et al.* (U.S.A.) gave a paper on erythrocyte-iso-antibody reaction in dogs, and further papers were presented on an experimental haemolytic syndrome by Drs. T. FORMAGGIO and PIOVELLA (Italy) and Dr. D. H. HEARD (England). Dr. R. CEPPELLINI (Italy) discussed the Rh antigen E^u, Dr. F. STRATTON (England) the D^u group of Rh, and Drs. S. D. LAWLER and R. R. RACE (England) the quantitative aspects of Rh antigens.

The final session began with a communication from Dr. P. VOGEL (U.S.A.) on technical considerations and results in replacement transfusion in infants, and Dr. T. J. GREENWALT (U.S.A.), Dr. W. C. MOLONEY (U.S.A.), and Dr. L. J. UNGER (U.S.A.) presented papers on various aspects of treatment and prevention of Rh sensitization. An interesting paper by Dr. J. V. DACIE (England) described the presence of non-specific incomplete "cold" antibodies in most normal sera. These incomplete antibodies differ in some ways from other types of antibodies such as anti-Rh, and might be a source of confusion in carrying out tests for "warm" antibodies, particularly in cases of acquired haemolytic anaemia.

MEDICAL PHOTOGRAPHY AT THE ROYAL PHOTOGRAPHIC SOCIETY

The photographs of medical interest at the 95th Annual Exhibition of the Royal Photographic Society at Prince's Gate are provided by comparatively few exhibitors. A possible explanation is the counter-attraction of the International Exhibition of Medical Photography which the Society sponsored earlier in the year and which was shown at the house of the Medical Society of London. This exhibition has also been seen at the Congress of Radiology and is due in Manchester in October. In the present exhibition all branches of photography are covered, and the medical prints must be comprehensible to the non-medical visitor assisted by no more extensive notes than can appear on the mounts.

The University of Zürich eye clinic has provided three mounts which are of fine quality, their pattern alone having a great appeal. The photomacrograph of the ciliary body will delight the ophthalmologist and the anatomist. The eye is always a popular subject, and Manchester Royal Infirmary shows an interesting traumatic arteriovenous aneurysm of the choroid. Other exhibits from this department are noticeable for clarity of detail; a composite mount of osteochondritis dissecans using radiographs and operation photographs may be cited also as a workmanlike piece of applied photography—it could not fail to be valuable to the teacher.

Pathological preparations are usually well represented. The sole example this year is from St. James's Hospital, Leeds, and shows a concurrent ulcer and remote carcinoma in a single specimen of stomach. The standard of pathological specimen photography, not only in Britain but generally, is surprisingly low when the large output is considered. This print is not of the quality we have come to associate with this department; it has probably been hung more on account of its rarity than its quality, for there is no doubt that it is flat, even making allowances for fixed material. The texture in the ulna exposed by a third-degree burn, from the same hospital, is nearer to their customary standard.

Medical photomicrography is provided by the radiotherapists. The Cambridge entry, optical sectioning of the unstained nucleus by ultra-violet light, is of excellent quality and exemplifies a valuable technique. Mr. Mitchell is to be congratulated on this mount. The Chester Beattie Institute shows several fine examples of mitotic figures in stained material.

There is a small group of transparencies, the majority in colour and all good. (Colour prints are still not within practical bounds for a busy hospital department.) St. James's shows stages in fasciectomy for Dupuytren's contracture. From Newcastle come two dental subjects; that of attrition of the upper incisors makes good use of a mirror to record the lingual aspect of the teeth. Manchester makes an interesting point with a pair of slides demonstrating the "mitral flush." One is an accurate "ektachrome" colour transparency, the other a black-and-white slide made on orthochromatic film. The latter shows not only the distribution of the flush but some freckles also, which are

barely noticeable in colour. This pair may provide some comfort to those who are prevented by budgets and lack of dollars from having all the colour they would like. The monochrome version, if the clinician or teacher will take the trouble to learn its interpretation, may well be equally useful at a fraction of the cost.

BRITISH ASSOCIATION MEETING

MATTERS OF MEDICAL INTEREST

The 112th annual meeting of the British Association for the Advancement of Science was held at Birmingham from August 30 to September 6. It was the most largely attended meeting outside London since the Association's jubilee year meeting, held at Manchester in 1887.

The presidential address, on "Man's Use of Energy," was given by Sir HAROLD HARTLEY, F.R.S., chairman of the Fourth World Power Conference, held lately in London. He ended his address with a strong plea for a survey, in respect of each country, of its natural resources, human geography, economic structure, and capacity to produce and consume: for only if the resources and potentialities of each country were known could the "natural wealth of the world, distributed in such an accidental way," be used to the best advantage.

Muscle Movements

The Section of Physiology, under the presidency of Professor R. J. BROCKLEHURST (Bristol), began its meetings with a discussion on muscle movements. This was introduced by Mr. W. GISSANE (Birmingham). His approach was that there was much to be learnt from the detailed study of the anatomical problems confronting the orthopaedic surgeon. This was illustrated by an account of recent research in the University of California on the movement of the limb bones during walking, in relation to artificial limbs.

Twelve medical students allowed pins, several inches long, to be inserted into the pelvis, femur, and tibia in order to serve as indicators of rotatory movements. The movements of the pins in normal walking were then recorded by film cameras in front view and from the side. The results showed that transverse rotations or angular displacements are more important in walking than has been previously accepted in Great Britain, and that function is intimately co-ordinated between muscles and joint ligaments.

Mr. Gissane also discussed the use of skin grafts in the treatment of extended burns; for full restoration of function it was necessary that the healing of the grafts should be complete within about 30 days—possibly due to the thickening of exposed fascial planes over longer periods.

Dr. H. D. DARCUS (M.R.C. Unit for Research on Climate and Working Efficiency, Oxford) described a dynamometer for the study of isometric muscular contraction in man. A twisting movement imparted to the dynamometer by the hand causes deformation of a tempered steel bar, the extent of which is measured with electrical strain gauges. The position of the subject can be varied with respect to the machine, and by a suitable choice of positions the performance of a single muscle can be studied. For example, it is possible to show that the biceps muscle is incapable of effective contraction between full pronation and about the mid-range of the movement, the supinator muscle being then effective. Other factors which may affect the result are training, muscular fatigue, and the variation in will shown by all subjects to exert the greatest force possible.

Mr. W. F. FLOYD (Middlesex Hospital), in a joint contribution with Dr. P. H. S. SILVER, showed oscillograms in which the degree of electrical activity in six muscles was simultaneously displayed for a variety of postures and movements. The act of standing requires little activity, and in most subjects a position of practically zero activity can be found. This is in contrast with commonly expressed views based on earlier observations on "four-footed and decerebrate cats," the relevance of which to an intact human subject might well be doubted. In standing with the eyes closed, corrective activity is increased, suggesting that the eye is an important agent in maintaining the upright position. In bending there is a critical point beyond which activity of the spinal muscles is inhibited, and this may have a bearing on the occurrence of slipped disks when a heavy weight is lifted with the spine bent. In sitting, the forward-slumped position makes a smaller demand on activity than postures conventionally regarded as more correct.

Dr. L. GUTTMAN (Spinal Injuries Centre, Stoke Mandeville) illustrated with films the teaching of "trick movements" to paraplegics with the object of obtaining maximum function from available muscles. "If a paralysed man can tilt his pelvis," he stated, "then he can walk." In reply to a question, Dr. Guttman said that much could be done even 8–11 years after injury. It was suggested that to the conventional anatomy of muscular movement there would have to be added a second anatomy based on the abnormal development and use of muscles which can be acquired.

Two papers bearing on the chemical basis of muscular contraction were presented at a later session held jointly with the Section of Chemistry. In the first, Dr. S. V. PERRY (School of Biochemistry, Cambridge) reported the shortening of myofibrils, isolated from rabbit skeletal muscle, in the presence of low concentrations of adenosine triphosphate. In the second, Dr. J. R. BENDALL (Low Temperature Research Station, Cambridge) described experiments on the shortening of muscle during rigor mortis—when work can be done by muscles in lifting a load. There is good correlation in time between shortening and the breakdown of adenosine triphosphate. This correlation holds good with a variety of prior treatments—for example, in muscles which have been fatigued or depleted of glycogen by starvation, in muscles well provided with glycogen at death, and in muscles from animals paralysed with myanesin or narcotized with "dial."

Functions of the Skin in Vertebrates

A joint meeting on the functions of the skin in vertebrates was held between the Sections of Physiology and Zoology. This was opened by Professor P. B. MEDAWAR (Birmingham), and consisted rather of a series of isolated contributions than of a discussion in the normal sense.

Professor Medawar reviewed research, largely in his own department, on the anatomical basis of skin pigmentation. Whereas the epidermis of the mammal is usually figured in textbooks as if all its cells belonged to a single division lineage, that of the Malpighian cell, there are in reality cells of a second and quite distinct lineage—dendritic cells. Their branches intertwine with the Malpighian cells and at their ends are button-like terminations or cups. Whatever other function these cells may have, they "are the sole origin and seat of the pigmentary function in mammalian skin," the melanin which they form being caused to enter the cytoplasm of neighbouring cells. The difference between negro skin and white is not in the number, shape, size, or distribution of dendritic cells, but in their physiological activity.

Dr. J. D. FINDLAY (Hannah Dairy Research Institute, Ayr) described experiments with Mr. W. R. BEAKLEY on the differences between Ayrshire and zebu (tropical adapted) cattle in relation to skin function and heat dissipation. Their conclusion is that neither of these breeds sweats, but that cooling in zebu cattle is facilitated by the large dewlap, in which there is a capillary network about ten times as great as in Ayrshire cattle.

Dr. W. S. BULLOUGH (Sheffield) spoke on skin replacement. Close observation shows that the cells of the epidermis divide according to set patterns and rhythms which vary from place to place across the surface of the body, the normal pattern being destroyed only in regions of inflammation or wounding. Epidermal replacement occurs mainly during sleep, and glycogen is normally the critical substance limiting replacement, but oestrogen has a positive activity of its own. The physiology of epidermal cell division, Dr. Bullough stated, is important not only for its own sake but in relation to the mechanics of growth and development, wound healing, and

possibly cancer—the incidence of which may be related to the rates of cell division, normal and abnormal, in the various tissues of the body.

Dr. J. S. WEINER (Oxford) described the experimental methods of sweat collection developed in the Climatic Research Unit at Oxford, and discussed the influence of skin temperature and other factors on variations in sweat composition. Professor J. D. BOYD (London Hospital Medical College) demonstrated with slides the effects of fungal infection associated with excessive sweating and the patterns of denervation resulting from neuromuscular surgery.

Hormones of the Digestive Tract

The presidential address of the Section of Physiology was given by Professor R. J. BROCKLEHURST (Bristol) on "Hormones of the Digestive Tract." His review covered work in this field from the time of Pavlov onwards and cannot be adequately summarized. It will be published in full in the October issue of *The Advancement of Science*. The distinctions were emphasized that, whereas the salivary glands are stimulated solely by their nerve supply, the stomach is stimulated by both nerves and hormones, and the intestine and its glands probably by hormonal mechanisms alone. Perhaps the most striking feature of these humoral mechanisms is that "there is nothing which corresponds with a co-ordinating centre for them; each mechanism is brought into play, when it is needed, by a particular event in the sequence of digestive process. So far as we know at present, they are found only in connexion with the stomach, the small intestine, and its associated glands." The investigation of the cells in which the hormones originate has barely commenced.

Professor A. A. HARPER (King's College, Newcastle-upon-Tyne) then described a modification of the secretin test. The modification consists in giving an intravenous injection of pancreozymin 30 minutes after the injection of secretin. This is followed by an increase in the output of amylase, lipase, and trypsin in the duodenal samples, as well as by further changes. The modified secretin-pancreozymin test thus gives additional information about the ability of the pancreas to secrete enzymes.

The activities of the intestinal mucosa were discussed by Dr. R. B. FISHER (Oxford). Its lining layer is of particular interest as the one barrier across which all ingested foodstuffs must pass before they enter the body fluids, and it is becoming increasingly clear that the majority of exchanges between the body and the intestinal lumen depend on the performance of work by the mucosal layer. Transfer, in other words, is not passive, but involves physiological activity in this layer. Glucose, for example, passes from lumen to tissue fluid even when the initial concentration is the same on each side. There is evidence also for the active transport of water across the intestinal mucosa, and strong indications that fat and the products of protein digestion are also actively transported. From previous work on the oxygen consumption of isolated intestines, it appears that the metabolic rate of the small intestine is very high; and the rate of cell division is so rapid (Leblond and Stevens) as to suggest complete replacement every 36 hours. Corresponding with this rapid growth process, a high rate of turn-over would be expected of mucosal protein. There have been no studies as yet of the incorporation of labelled amino-acids into the mucosa alone, but it has been shown by this method that the turn-over of proteins in the intestinal wall as a whole is higher than in any other tissue in the body. Together with evidence suggesting that the whole cytoplasmic protein of the body acts as a protein store, "it seems eminently reasonable" that the first step in protein absorption is the synthesis of mucosal protein, and the second its breakdown, with the products of breakdown passing into the tissue fluids.

Nerve Fibres

A group of papers on "The Nerve Fibre" was introduced by Professor J. D. BOYD (London Hospital Medical College), who reviewed the anatomy and histochemistry of vertebrate peripheral nerve fibres and their sheaths. He drew attention to the problems of remote control by the cell nucleus, of tracing the fibrils of the axon back to the cytoplasm of the cell body, where they divide on either side of the nucleus, of the origin of the myelin sheath as between nerve cell and Schwann cells, and of the doubtful validity of any hard-and-fast distinction between myelinated and non-myelinated fibres.

Dr. A. L. HODGKIN (Physiological Laboratory, Cambridge) summarized recent work at Cambridge relating nerve conduction on the one hand with changes in electrical potential as between the inside and outside of a fibre, and on the other with the permeability of the fibre to sodium and potassium ions. The two effects are complementary. In the resting nerve, the outside of the fibre is 50–100 millivolts positive with respect to the inside, and the membrane is selectively permeable to potassium. On activation, conditions are reversed: the outside of the fibre is now 30–50 millivolts negative, and the membrane is selectively permeable to sodium. The potential difference is reversed by the entry of sodium into the fibre, and restored by the exit of potassium. On the other hand, the permeability change is itself initiated by electrical stimulation. The progression of activity along the nerve is interpreted as being due to the cancellation of the external negative charge at the point of activity by the positive charge of adjoining sections of fibre; and the effect of the myelin sheath, interrupted at the nodes of Ranvier, is to increase the distance over which cancellation takes place, so speeding conduction along the fibre. Repeated stimulation increases the sodium content of the axon and reduces its potassium content, and time is necessary for these changes to be reversed.

Dr. B. KATZ (University College, London), who was unable to be present, was to have put forward the view that an electrical change must be produced in a sense organ before messages can travel along the appropriate sensory fibres; and that this is so whether the initial stimulus is light, sound, mechanical pressure, or a chemical substance.

Dr. F. K. SANDERS (Oxford) described experiments on the migration of virus particles along nerve fibres, and the multiplication of the virus. He has worked with the spontaneous encephalomyelitis virus of mice (mostly with the "severe" strain, G.D.VII). This is not closely related to the virus of poliomyelitis, but its behaviour is similar to that of the poliomyelitis virus in monkeys and possibly in man. The virus particles travel at 0.5 mm. per hour (compared with the 2.5 mm. per hour reported for poliomyelitis in monkeys). If inoculated into tongue muscle, the virus particles are first detectable in the first group of nerve cells serving the tongue at about 20 hours from inoculation. Between 30 and 60 hours, virtually no virus can be demonstrated in these cells, which may mean that the virus has been "dis-assembled" in some way so that it is no longer infective. Yet from 60 hours onwards there is very rapid increase, and at 100 hours more than one million times as much virus can be recovered from these cells alone as was originally inoculated. The attainment of maximum virus concentration closely coincides with, or perhaps precedes, the onset of tongue paralysis.

Psychology

The presidential address to the Section of Psychology was given by Professor J. C. FLUGEL (University College, London). In a discussion of "Human Affairs and the Psychological Point of View," he suggested that there was room for a closer psychological approach to economics (e.g., on the motivation of spending and saving). He referred to the conflict between the legal and the moral points of view resulting from the increasing penetration of the psychologist into the field of delinquency, and to the further conflict raised by the application of psychological approach to the investigation of the religious attitude. The most urgent need was perhaps for the greater adoption of the psychological point of view in the field of politics, with which existing "social psychology" had little contact.

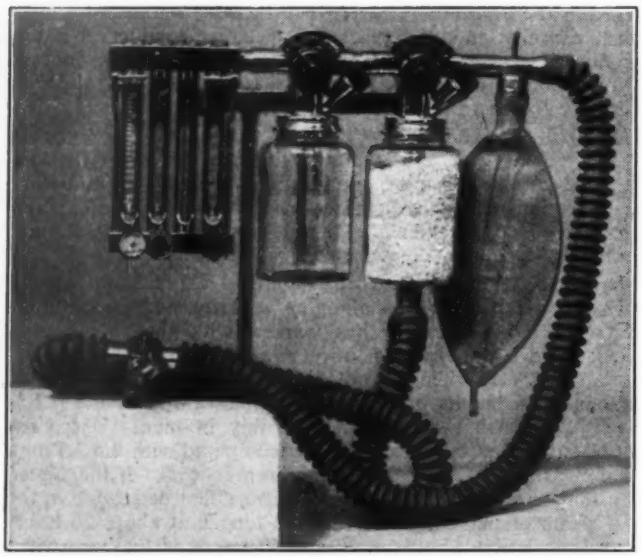
Professor C. W. VALENTINE (Birmingham) suggested that the tendency to explain every problem child in terms merely of environmental factors had gone too far, and that "even in America" a back-swing had now begun. Mr. P. SMITH (late principal assistant organizer, City of Birmingham Education

Committee) reviewed experience of 25 years of research on vocational guidance in schools; the most important single conclusion being perhaps that "vocational guidance cannot easily, and indeed should not, be separated from educational guidance."

Preparations and Appliances

NOVEL MODIFICATION OF BOYLE'S ANAESTHETIC APPARATUS

Dr. W. B. PRIMROSE, senior anaesthetist, Glasgow Royal Infirmary, writes: The conventional gas–oxygen anaesthetic apparatus installed in most hospitals now consists of a sight-feed unit for the gases, followed in series by a chloroform bottle, ether bottle, and breathing-bag with tubular connexion to the patient, all parts being under the control of valves. This arrangement does not permit the use of carbon dioxide absorption: for this a special absorbing unit of elaborate design and make is required which is fed with gases from the machine through a tubular connexion. The accompanying photograph



shows the manner in which a simple absorbing unit can be incorporated with the anaesthetic apparatus, rendering any elaborate means for CO_2 absorption unnecessary.

The alterations required are very simple, and the arrangement depends upon the fact that neither chloroform nor "trilene" should be used with an absorber. This means that the chloroform bottle is removed. Its place is given to the ether bottle, which remains an essential component of the system. The header to which the ether bottle was previously attached has its immersion tubular parts removed by unscrewing them in the case of the bakelite mount: the plunger rod is, however, left in place. The exit orifice of the header through which the vapour normally passes to the patient is carefully enlarged to 7/16 in. (1.1 cm.). In the case of the all-metal mount, nothing is removed. The exit aperture is again enlarged to a corresponding degree, both on the bottle side and also on the breathing-bag side of the barrel valve. This is done with the turning lever at the full "on" position, and in such a way that the valve closes completely at the "off" position.

The absorber consists of an ether bottle which has a hole drilled in the bottom to take the British metal-tube fitting. This is fixed by screw collars with rubbers to protect the glass and to give gas-tightness. To this fitting is attached the expiratory tube from the face-piece mount. The absorber, filled with 1 lb. (454 g.) of soda–lime granules, screws into place in the usual way. The circuit is completed by the inspiratory tube which passes from the breathing-bag to the face-piece.

The face-piece mount, to which the hoses are attached, consists of a Barth three-way valve with an adjustable expiratory valve suitably fixed to it. This very light and convenient valve provides all requirements for breathing. Air can be breathed. The "no valves" position with the expiratory valve provides the ordinary gas–oxygen–ether (or other) anaesthesia. In this position the absorber is shut off at the face-piece in addition to its being cut out at the header valve when in the "off" position. The "valves" position provides circuit breathing through the absorber, which must also be "on" at the header valve.

In circuit breathing the rubber flap valves are kept moist unless they are allowed to get dry from periods of inaction. It is generally known that rubber will not distort for a long time if kept damp and cool. The valves should, of course, be changed at intervals of from three to six months, and, provided this precaution is observed, there should be no leakage.

If it is desired to use trilene or chloroform the absorber is removed and the fittings for the chloroform bottle are replaced in the case of the bakelite mount. The expiratory tube can be detached from the Barth valve, when the apparatus becomes as originally arranged. Confusion or accident from decomposition of these drugs cannot take place.

The advantages of this simple modification are considerable. The changes themselves are easily carried out and there is no essential interference with existing parts. The absorber can be changed in a few seconds, during the operation if necessary, as the only screw to be manipulated is that of the bottle—about one and a quarter turns. The original Boyle machine with absorber is now self-contained and eminently portable.

The method of single-phase absorption has been found quite satisfactory in anaesthetic work over the past 12 years. In the past 20 years I have tried circuit and to-and-fro breathing in both liquid and solid absorbents, and find that expiratory absorption is as good as any.

I am indebted to Messrs. Vicarey, Davidson and Co., 162, Bath Street, Glasgow, C.2, for carrying out my instructions in producing this modification.

According to a report from the Director of Medical Services, Uganda, the incidence of yaws has been exceptionally high for many years among the 266,000 inhabitants of Lango District, where the number of sufferers seeking treatment was never sufficiently great to reduce the reservoir of infection. Consultations were held in 1948 between the African local authorities and medical department representatives, as a result of which it was decided to embark upon an intensive campaign. The whole population has now been examined, and some 22,000 infectious cases were treated with arsenicals and bismuth during the last sixteen months. The district was divided into sectors, which were covered methodically by teams of trained African staff under a European medical officer responsible for organization and supervision. The results of the campaign appear to be excellent. A follow-up scheme in progress aims at the elimination of infections which were not detected during the campaign. One of the most difficult problems facing the public health workers of colonial territories is to find means of arousing popular interest in simple sanitary matters, any attempt to impose new habits by edict being of no avail. With this in mind a mass health education scheme was started early this year in one of the most densely populated areas between Kampala and Jinja. The scheme was designed to draw attention to the transmission of intestinal bacteria and worms. Lectures, demonstrations, and discussions were held, and films, photographs, and slogans were displayed. Chiefs and other African officials from all over the country attended the course, which lasted a week. The whole "school" was then moved to each county sub-centre for a week, where many local people came to see what was happening, stayed to ask questions, and often lent a willing hand in the construction of latrines and the protection of water supplies. There were signs that those who attended the "schools" were beginning to show interest in the reduction of intestinal infections.

Correspondence

Psychology as Science

SIR,—It is good, even at the cost of an expressed difference of opinion by an old pupil in whose psychiatric education he can never have taken great pride of achievement, to have stimulated the return of Dr. Bernard Hart (September 9, p. 623) to a scene in which he has been so distinguished a figure, and his letter must increase our regret that his wisdom and experience do not more often find public expression in a field of medicine where they were never more needed than to-day. Nevertheless, I believe that there is a greater measure of agreement between us than of difference, though I still must feel that the inferences I drew from his lecture are valid and necessary. He allows that psychopathology comes only in part, and then imperfectly, within the discipline of science. But since Dr. Hart accepts Karl Pearson's postulates, this element of science can only be natural science, for the postulates are not applicable to a science of history. Indeed, we may doubt whether Pearson would accede to the notion that there could be a historical "science." It is for this reason that I felt I had to equate Dr. Hart's use of the term "science" with "natural science." Further, if the intrusion of "purpose" in psychopathology requires this to be placed within the fold of biology, then this "purpose" can only be teleology. Yet surely it is not teleology that he had in mind. Thus I conclude that there is involved in his thesis the error of using one term in two senses in one argument.

Dr. Hart now believes that false systems of thought should be allowed to die of natural decay while we passively await their replacement by sounder systems. If a purely philosophic system were in question, this view would have the sanction of history, though even the ghosts of dead philosophic systems still haunt us. But psychological medicine is more than a system, if less than a philosophy. It is also a methodology, indeed a number of methodologies, and these have the widest effects upon the community. They influence thought and practice in every field of medicine. Views about them, of varying degrees of naivety, are put abroad by politicians, journalists, and novelists, and now by the terms of the Criminal Justice Act of 1948 the State has made the psychiatrist an official participant in the administration of the law, and in a manner which gives him a dangerous latitude in his treatment of certain offenders before the courts who are certifiable neither as mental defectives nor as persons of unsound mind. In these circumstances we cannot stand silently by while unsound systems and methods of medicine die tediously of natural decay, doing perhaps an infinity of harm in the process.

In the past literature has owed an immeasurable debt to literary criticism. Is it to be assumed that the science and arts of medicine do not need, and should not receive, the same kind of salutary corrective? If Dr. Hart had really thought this he would never have given us his critical and stimulating Goulstonian lectures, which still contain valuable lessons and great delight for all who read them.—I am, etc.,

London, W.1. F. M. R. WALSHE.

Training for General Practice

SIR,—The consensus of opinion in your recent educational number was that medical education was barking up the wrong tree in that it produces ill-developed polyvalent quasi-specialists instead of general practitioners. As your contributors pointed out, the course for a medical student as at present designed pays but the scantiest attention to the needs of the general practitioner. Therapeutics are rather frowned upon by physicians when teaching students. I well remember one of my chiefs answering a question on the treatment of a case by saying, "Learn the signs and symptoms now: therapeutics will come later." That eventual time did not come until I had left my hospital and, away from the guiding hands of sister and dispenser, I was faced with the difficult problems of medicine in a Families Welfare Centre in the Army. No time now to sneak away and look up a textbook of therapeutics. Only time to write a prescription and hope it was the correct line of therapy and that its ingredients would be palatable and compatible.

Paediatrics, now forming a large part of my practice, was taught by six weeks' children's clerking combined, if I remember correctly, with venereal diseases, but it was August and the chief was away on his summer holiday.

As a student I just achieved my 25 midwifery cases, and if I had not had the privilege of being resident accoucheur after qualifying I should soon have become one of those who were recently described in your columns as wildly wielding the forceps. Skins, fevers, minor orthopaedics, and oto-rhino-laryngology are all now painful exercises in temporizing while I have time to ask somebody's opinion or read it up.

Not only are the wrong things taught to students but the methods employed are inefficient. Despite all the evidence of special methods of teaching presented in your pages, I am not convinced that they will ever replace some of the traditional methods. I was surprised that no one called for an extension of ward teaching, and in fact the general impression was that this method was disparaged by your reformers. Ward teaching has always been one of the prides of the English medical schools. It is still paid great lip service by our teachers, and many complain that they do not see the students in the wards as much as in the old days. The reason for this is not far to seek. When I held my clinical appointments in 1945 I had from eight to ten cases to look after at any one time. When I came on the house in 1948 I found that the clerks and dressers were lucky if they had three or four cases, and I know of some students who from no fault of their own had never seen a case of acute appendicitis when they qualified. In the same period the introductory course had been extended from three weeks to three months, the teaching in psychology and psychiatry had increased, and now it is rumoured that the students are soon to be taught French and German. Surely the time is out of joint. Yet one of the solutions has been so often hinted at. I remember a friend who in desperation before finals was able to spend an afternoon in a cardiac ward of a municipal hospital. There he discovered that there was a difference between early and mid-diastolic and pre-systolic murmurs and that the third and fourth heart sounds really existed. Here is one efficient way to train the primary instruments of the doctor—his eyes, ears, and fingers.

But even when the student has gained a knowledge of the well-known and well-defined textbook illnesses and has qualified, it will be many years before he becomes proficient in that most difficult of all specialties, general practice.—I am, etc.,

Farnborough. J. D. BURY.

SIR,—May a practitioner 40 years qualified venture some comments on the article by a general practitioner (August 26, p. 493) on his medical education 25 years ago? Inevitably these comments must be reminiscent and egotistical, but I am glad to say that they are of a purport relating to my own day quite contrary to the somewhat disgruntled carping with which your younger contributor refers to his. Perhaps because I lacked his more enviable background of University culture and came straight from a rather spartan northern public school, and also, no doubt, because a medical career was my own avid choice and not a parental *Diktat*, I entered the busy world of the London Hospital and its college in 1905, and remained there as a student and resident until 1912 with unalloyed enthusiasm and satisfaction. With a bare minimum of cash, an old football injury limiting games, and a "cribriform" type of memory, it was possibly for my good that hard work was imposed upon me; but I still remember with respect and gratitude all my teachers, and their inculcation of principles and practice which have remained throughout the years as an inspiration and guidance for the work of each day. The emphasis was always upon the practical, and was focused on

the patient, his history and physical examination. The ancillary methods of clinical pathology were—and properly so to my archaic mind, *pace* the strictures of a research scholar of much erudition and less horse-sense on the imperfections of British general practice—relegated to the pathological laboratory as the only environment in which they could attain a true accuracy.

Many of my teachers are gathered to their fathers. Some happily remain, but all my generation and later ones who came under the influence of Arthur Keith, Leonard Hill, William Bulloch, Hubert Turnbull, Robert Hutchison, Henry Head, James Sherren, Russell Howard, and James Walton and their contemporaries must remember them with respect, gratitude, and affection. The hospital itself was a world teeming with the activity of all sorts and conditions of humanity, of all races, creeds, trades, and temperaments. Apart from formal teaching there were unceasing opportunities for increasing knowledge of men and things by continuous intercourse and contact with keen and often brilliant minds among teachers, residents, students, and laymen alike, whilst an ever changing pageant of clinical material unfolded itself before the inquiring eye.

Medical education was in those days much simpler, to-day it is no doubt much better, but I would aver that in my day at "The London" it was a vital and invigorating discipline. —I am, etc.,

Minehead. H. B. WALKER.

The Importance of Preventive Medicine

SIR,—Last year I commented on the section on public health services in your educational number. Your contributor then said that prospects in public health had never been better. Many of us considered this to be wishful thinking, and the pitiful contribution in this year's educational number shows how right we were. The disquieting drop in the numbers taking the D.P.H. course is confirmation if any were needed.

Financial prospects apart, what is wrong with public health, or, as I prefer to call it, preventive medicine? The preventive specialist used to have his roots in hospital and domiciliary medicine, and one of his main contacts with the public through them. The National Health Service Acts have cut these roots. Owing to financial stringency no new ones have grown, and the result is that the preventive specialist has had his potentiality for good very severely restricted. Prior to July 5, 1948, approximately two hospital beds out of three in Scotland were provided by the local authorities. The extent of the restriction will thus be seen by reference to the following table taken from the national estimates:

National Health Service Estimates Scotland 1950–1 and 1949–50

	1950–1	1949–50
	£	£
Hospital and specialist services ..	31,986,000	28,761,000
General medical services	16,402,000	17,449,000
Local authority services	1,350,000	1,100,000
All other services	1,516,000	1,668,300
Totals	£51,254,000	£48,978,300

In other words, one-fortieth of the expenditure under the Scottish National Health Service Act is directed towards the prevention of illness and preservation of health. That is what is wrong with public health.

Dr. Frank Gray's presidential address (*Supplement*, August 12, p. 85) indicates part of the way. He says that the hospital is antagonistic to preventive medicine, and that the way of salvation for the general practitioner lies in interesting himself in the trivialities with a view to the prevention of serious illness. I heartily agree. The general practitioner is in a position to do more for the nation's health than anyone else. There has sometimes in the past been antagonism between him and the local health department. Provided that he realizes that the local health department has much help to offer him, and he to offer to the department, there is no need for any antagonism. The local authority clinic did great service in the days when every visit to the private doctor cost money. Now that the general practitioner's surgery is a "free for all" in more ways than one, the general practitioner should welcome the opportunity to see pre-school children on his list, at the clinic, for a fee. Similarly he should be prepared to act as medical officer to a school, to get to know the pupils and the relationship between their health and their educational progress. Before undertaking such duties, however, he should have training and experience which as a rule are not his. There is much in the D.P.H. course that could and should be included in that for the undergraduate, and there is much specialist training in the latter which should be jettisoned. The discipline of applied physiology and applied bacteriology, the latter leading on to epidemiology, is in my view vital. And, above all, the introduction to preventive medicine should be made no later than that to curative medicine.

So much for the general practitioner's approach to and place in public health. What now of that of the trained preventive specialist? Hitherto he has, as a rule, been drawn to public health at an early stage in his postgraduate career. Perhaps this has had something to do with the antagonisms previously mentioned. I do not think that recruitment from the ranks of general practitioners could be improved on. And incidentally I consider that this applies to clinical specialism as well as preventive. Satisfactory work in the child welfare, school health, and epidemiological branches should count towards a specialist diploma in preventive medicine. This should preferably be granted by a national college or faculty of preventive medicine and replace the existing statutory D.P.H.

Finally, a new local health authority must be set up, under which the general practitioner, preventive expert, and clinical specialist all play their part in the health team. General practitioners will form the forward line, leading the attack, preventive specialists will be the half-backs, and clinic specialists the backs and goal-keeper to cover up when play goes against the attackers. This local health authority must have all the functions, health and welfare, of the existing local health authority. It must take over the functions of the local executive council, and of the local hospital management committee. It must have the closest possible liaison with the National Assistance Board and the Ministry of National Insurance. By this means alone, full inter-service co-operation, can the full potential for health of all parties be developed and the National Health Service be made to pay dividends instead of swallowing money in its present prodigal way.—I am, etc.,

Elgin. I. C. MONRO.

Mechanical Aids to Instruction

SIR,—The excellent article on this by Drs. R. Ollerenshaw and P. Hansell (*Journal*, August 26, p. 488) serves to stress the importance of these aids, which was very obvious at a recent large international congress where the failure of many speakers to make proper use of the diascope and epidiascope was a cause of great discomfort to the audiences. After attempting to see and read wholly illegible matter projected by epidiascope, one came to the conclusion that societies should prohibit the use of this form of projection until speakers learned to use it properly. Even lantern slides were often of very poor quality, or overcrowded with figures.

On one point one cannot agree with Ollerenshaw and Hansell. They say, in speaking of lantern slides, "Script is always more legible when projected as a white image on a black field than in the more usual black and white." I have always found that staring at a black screen with white script has a curiously irritating effect, and that one soon tires. Other members of the audience usually agree that this is an unsatisfactory form of projection. When this form has been used, one has usually blamed the speaker for showing negatives and being too lazy or too parsimonious to have proper positives prepared. The subject appears to be worth investigating from the physiological and psychological aspects.—I am, etc.,

Edmonton, N.18. A. B. ANDERSON.

Traumatic Neurosis and Electro-shock

SIR,—It must be so rarely that electro-shock treatment administered in this country meets with misadventure that it may be of interest to mention a case in which it led to a severe traumatic neurosis—the most severe case of conversion hysteria I have met with, even in the psychotherapy of two world wars.

She was a patient of 34 who had been paralysed for twelve years in both legs, was emaciated, 5 st. (32 kg.) in weight, would not and could not eat, and had such severe headaches and noises in the head that she could not read, nor listen to the radio, nor meet visitors. The headaches took the form of pressure in the cranium and a "cracking" and "grating" in the occiput, as of a fracture. The noises were described as "Morse sounds" of someone constantly crying, interspersed with someone screaming. She also heard voices in German saying, "Won't eat! I can't go on," etc. These noises and voices were so loud and insistent that she projected them and thought they came from someone crying in an adjoining room or in the street, and often asked that they should be stopped. It is not surprising that on several occasions she attempted suicide, and that her condition was falsely diagnosed as schizophrenia. She also suffered from "fits," and was on occasion found on the floor in the morning unable to move because of her paralysis. These fits were diagnosed as epileptic, and she was given "epanutin" for several years.

She was treated psychologically by the abreaction method (reliving the experiences, releasing the repressed emotion, and readjustment to the situation), and the causes of her symptoms were revealed. It transpired that the cracking and grating sensations in the occiput and the headaches originated in a car accident in which she was thrown on the back of her head on the hard road and suffered "concussion." This accident does not concern us except that it was for the results of this accident that she was first treated medically in Germany and then sent to a psycho-analyst, obviously of the cruder type, whose insistence that she was sexually in love with her father and that she must fall in love with him, the analyst, before she could get better so distracted her that she became much worse and had to be sent to a mental hospital, was diagnosed as schizophrenic, and there received electroplexy in 1938.

This apparatus seems to have been of the somewhat primitive type, and she was warned that on no account must she let the electrode slip. Three or four times the administration was satisfactory, but on the occasion in question, just before the shock was given, she felt the electrodes slipping. She was filled with horror, and yet dared not move to stop it in case it made things worse. The shock was administered, the instruments were smashed, the doctor and nurse also received shocks, and the patient experienced a terrific blow on the head followed by the convulsion, during which, as it transpired, she was quite conscious. But she developed an amnesia for the whole experience. Her symptoms originated from this dissociation; they were in fact a revival of what she had experienced but repressed and forgotten. The so-called "epileptic" fits were a reproduction in detail of the convulsion itself, the "Morse noises" were of her own crying when in the dissociated state of shock, interspersed by a scream when she moved and felt a severe pain in her back, presumably from a compressed fracture. The voices she heard were her own voice saying, "I can't go on," etc., when in the dissociated state. The paralysis was partly due to the previous car accident (for after that she suffered from periods of paralysis) but finally and persistently from the electro-shock. There were of course predisposing causes going back to childhood, as we always find even in traumatic cases, but they do not concern us here.

By the recovery of all these experiences all her symptoms have one by one disappeared as they were analysed, and she has now made an almost complete recovery—she has had no fits for some months, no headaches, and the noises have gone. She is now able to walk on the level, though not yet upstairs without help owing to the disuse of her limbs for 12 years, is eating heartily, and has nearly doubled her weight.

This case supports the view of Janet, Freud, and others that it is not the physical shock alone but the psychic shock, in this case the conscious horror of the experience, which produces the traumatic neurosis. This explains why it is that patients undergoing electro-shock do not always suffer from traumatic neurosis. If traumatic neurosis were the result of physical shock as some maintain (as in the case of shell shock), electro-shock treatment should always end in neurosis. This patient had had three or four previous doses of shock treatment without any effect, bad or good, although the shock was sufficient to make her unconscious. In this last instance she was conscious of the horrifying experience although it was dissociated. This case also reveals the interesting fact that projected voices, although regarded as real by the patient, may be due not to paranoia or schizophrenia but entirely to psychological dissociation.—I am, etc.,

London, N.W.1 J. A. HADFIELD.

Poliomyelitis

SIR,—In the excellent refresher course article on poliomyelitis by Dr. Howlett Kelleher in the *Journal* (September 2, p. 570) very little mention is made of the infectivity of the disease. No advice is given to the G.P. on isolation of contacts, nor of any necessary disinfection of rooms, clothing, etc. These are questions always asked by relatives, and a clear guide to the practitioner would be, I am sure, very generally welcomed. Recently, while doing a locum, I have had a case brought to the surgery, and felt it my duty to close the rooms until they were disinfected by the health authority. Was this necessary? I am, etc.,

Hambrook, Bristol. G. S. KEELING.

*** Some of the points raised here are discussed in a leading article this week. For advice on disinfection in individual cases, medical officers of health should be consulted.—ED., *B.M.J.*

Haematemesis from Leeches

SIR,—The following case was recorded in April, 1950, at a camp for Arab refugees situated in the Jordan valley. It compares with an anecdote about Rhazes (Ar-Razi), the renowned Arabian physician who lived from A.D. 850 to 923, and bears out the aphorism of Rokitansky: "Those about to study medicine, and the younger physicians, should light their torches at the fires of the ancients."

Case Report.—An Arab boy, 7 years old, was brought to the camp clinic by his father, who complained that the boy had vomited blood three times during the preceding two days, but was otherwise quite well, without any pain or nose-bleeding, and, apart from measles and ascariasis, had had no previous illness. The boy vomited shortly after his arrival: the vomitus was not large in quantity and contained fresh blood, together with typical "coffee grounds," mucus, and food residue. On examination the boy was seen to be pale, but of good physique. He was intelligent and co-operative. There was no conjunctival or mucosal pallor, and no signs of dried blood on the external nares. The teeth were in good condition, but the gums were hypertrophic and bled easily (a very common condition among these children). Tongue and fauces were normal, but a small black object was momentarily visible behind the uvula. On further examination with a mirror this proved to be the tail of a large horse-leech, which was firmly attached to the posterior wall of the naso-pharynx. Traction on the leech with forceps failed to remove it, owing to its properties of tenacity and elasticity. With a view to local anaesthesia the throat was then sprayed with 5% cocaine hydrochloride; fortunately this had the additional effect of partially paralysing the leech so that it became easily detachable, and it was removed and identified as a specimen of *Limnatis nilotica*. Needless to say, the vomiting of blood did not recur.

The following anecdote is quoted by Professor E. G. Browne in his FitzPatrick Lectures on Arabian Medicine. It appears in the works of several Arab writers, particularly Qadi Abu Ali at-Tanukhi, whose account is particularly valuable, as he was almost a contemporary of Rhazes.

A young man who had recently travelled from Bagdad was troubled by the vomiting of blood, and he went to visit the famous physician. After careful examination, however, he was unable to explain the cause of his symptoms. The patient was in despair, believing that where Rhazes had failed none other could succeed. The physician, touched by his distress as much as by his faith, then proceeded to question him carefully as to the water he had drunk on his journey, and ascertained that in some cases it had been drawn from stagnant pools. "When I come to-morrow," said he to the patient, "I will treat you and not leave you until you are cured, on condition that you will order your servants to obey me in all that I command them concerning thee." The patient gave his required promise and Rhazes returned the next day with two vessels filled with a water-weed, which he ordered the patient to swallow. The patient, having swallowed a considerable quantity, declared himself unable to take any more, whereupon the physician ordered the servants to hold him on his back on the ground and open his mouth, into which he continued to cram more and more of the nauseous substance until

vomiting ensued. Examination of the vomit revealed a leech, which was the source of the trouble and with the expulsion of which the patient regained his health.

Two further cases of leech infestation were seen during a period of eight months in Transjordan. In one case the creature was attached to the epiglottis, in the second case it was in the pharynx. In neither of these cases was haematemesis the presenting symptom. Such leech infestation is not uncommon in tropical and sub-tropical areas. Manson-Bahr and Stitt, for instance, both describe horse-leeches as being liable to occur in this situation, but the usual presenting features are said to be epistaxis and persistent headache.

It is debatable whether Rhazes had made the diagnosis, and it seems possible that his therapy was based on the magical law of similarity (homoeopathic magic), which is still prevalent at the present day in Arab folk medicine. Muhammad 'Awfi, however, writing in the thirteenth century, gives Rhazes credit for the diagnosis and states that the leech when swallowed in the drinking-water had attached itself to the mouth of the patient's stomach and there remained until induced to transfer itself to the more congenial water-weed.—I am, etc.,

A. CAMERON,
Lately with British Red Cross Commission, Jordan.
Guildford.

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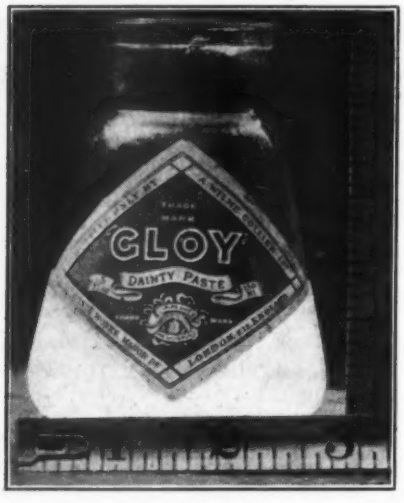
An Unusual Foreign Body in the Rectum

SIR,—Although medical literature contains a long list of reports of foreign bodies in the rectum, I consider the following case of sufficient rarity and interest to add to the already formidable list.

A married professional photographer, aged 48, stated that, while reducing his piles following defaecation, he slipped and fell and became unconscious. On recovering he had agonizing rectal pain and then noted the absence of a paste pot which had been standing on the lavatory floor. After feeling the paste pot in his rectum he got on his motor-cycle and rode eight miles to his doctor and a further three miles to hospital. On admission he was in considerable pain, but regarded his accident with a certain amount of humour.



On rectal examination, about ½ in. (1.3 cm.) above the deep sphincter the bottom of a large bottle could be felt, but it was impossible to get beyond it. The sphincters and mucous membrane were grossly dilated and oedematous, but not lacerated. Under general anaesthesia the bottle was found impacted between the bodies of the ischium laterally, the pubis anteriorly, and the lower end of the sacrum posteriorly. A finger could be passed beyond the rim of the bottle on the postero-lateral quadrant, but it could not be moved in any direction. Attempts were made to extract it with various forceps, but without success. A laparotomy was carried out through a left lower paramedian incision, and again it was found impossible to push the bottle out of the rectum from above. The rectum was opened, but the bottle could not be got up out of the pelvis.

It was finally found necessary to break the bottle in the rectum with a hammer and chisel before removing it in pieces. This resulted in some laceration of the rectal mucous membrane, which was repaired. The opening in the bowel was closed and a left inguinal colostomy performed. The pelvis was drained with corrugated rubber and the wound closed in layers.

During the post-operative period he developed some proctitis and a small faecal fistula along the drain (from the pelvis). Sphincter exercises were begun after ten days. The fistula closed and he was discharged from hospital in four weeks. He was readmitted after two months for closure of his colostomy. His sphincter tone and rectal mucous membrane were then normal and he was discharged with a normally functioning bowel.

He has kindly photographed an identical bottle with measurements.

I am indebted to Mr. F. H. Scotson, consulting surgeon, under whose care this case was, for giving me permission to publish.

—I am, etc.,

Manchester, 8. J. B. PRENDIVILLE.

Erythroblastosis Foetalis Following ABO Incompatibility

SIR,—We wish to report an interesting case referred to us by Mr. Rutherford Morison, of Harrogate.

A primipara, aged 28, was admitted to a maternity home on April 4, 1950, being then 26 weeks pregnant (B.P. 180/120, albumin ++). The uterus was much larger than normal for dates. A radiograph of the abdomen showed a single foetus presenting as a breech with extended legs and confirming the age as 26 weeks. No foetal abnormality was seen. On Wednesday, April 5, 1950, her membranes were ruptured and several pints of bright yellow liquor were withdrawn. After being in labour for about 36 hours she was fully dilated but without progress for over two hours. An abdominal palpation, even allowing for the amount of liquor withdrawn from the uterus, gave the age as 34–36 weeks. The foetus and the placenta were removed per vaginam only with the greatest difficulty. The foetus was so oedematous as to be the equivalent more or less of a full-term foetus. Ascites was so marked that the abdomen of the child had to be punctured before it could be delivered. The placenta was mushy and came away piecemeal, in spite of which the amount of post-partum haemorrhage was minimal. There was a second-degree tear. A post-mortem examination was made on the child on April 7, 1950, at the National Blood Transfusion Service Depot, Leeds.

The whole foetus was very oedematous but not macerated. All subcutaneous tissues were waterlogged—the scalp floating on the skull. The brain was oedematous but otherwise normal. The dorsal spine and one thigh had been fractured at delivery. The skin was pale and very slightly jaundiced. At examination there was almost no blood in the child at all. The liver was enlarged, and grossly and visibly degenerated. All other organs appeared normal. These macroscopic appearances suggested haemolytic disease of the newborn in the form of hydrops foetalis.

A piece of the liver was sent to the Pathology Department at Leeds University for histology, which reported:

"The sections of this liver show most extensive extra-medullary haemopoiesis, the majority of the sinusoids containing primitive (marrow) forms of blood cells. There is also a marked degree of haemosiderosis, the iron-staining pigment being dispersed in fine granules within the liver parenchymatous cells. The liver cells show a degree of cloudy swelling but no advanced degeneration. There is no cirrhosis and nothing to suggest congenital lues. The histological appearances are without doubt those of erythroblastosis foetalis."

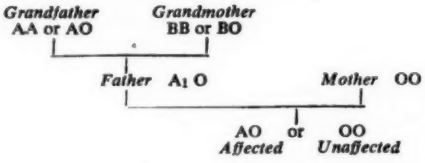
Meanwhile samples of the mother's blood showed her to be Group O Rhesus-positive, genotype R_1R_1 (CDe/CDe). A Kahn test had proved negative. Setting up the mother's serum against a panel of known Group O cells showed that there were no rhesus antibodies of any kind present about this time—i.e., April 10, 1950. The husband's blood was taken and found to be Group A rhesus negative (r r, cde/cde).

As the serological findings conflicted with all other evidence, further samples of the mother's blood were examined on May 12, and with the following result as regards the alpha titre. It was found that the mother's serum haemolysed the father's red cells to a titre of 1 in 4 and afterwards agglutinated them to a titre of 1 in 16,384 in saline and 1 in 128,000 in albumin. An indirect Race–Coombs test showed a titre similar to the albumin result.

As the child had been born dead no blood was taken from it, but it was presumed to have been Group A (from the father). ABO incompatibility seemed a certainty as the cause of foetal death. It seems possible that the high alpha titre was in part naturally occurring, as the mother gave no history of previous pregnancy in any form, nor of any previous transfusions or injections of blood at any time. A further sample of the mother's blood was taken on May 27, 1950. This showed no change in the alpha titre.

The parents were anxious about the prognosis. Accordingly, in order to find out whether the father was heterozygous, blood samples were taken from the father's parents. Grandmother,

Group B; grandfather, Group A. It was calculated as under that each pregnancy produced a 50/50 chance of the infant being affected—and probably dying *in utero*.



Further estimations of the mother's alpha titre will be made.—We are, etc.,

National Blood Transfusion Service, Leeds.

R. T. D. FRANKLIN.
P. NEWSTEAD.
M. PASHLEY.
R. B. ROY.

Myeloid Leukaemia and Pregnancy

SIR,—In order to add to the list one more instance of chronic myeloid leukaemia associated with pregnancy, I record the case of a woman who, some fifteen years ago, was admitted in the early days of the puerperium to the Crewe Memorial Hospital as suffering from puerperal sepsis.

She was pyrexial, had localized infection of the breast, vulva, and skin, a large spleen, and cardiac murmurs. Before the blood film was seen, the likely diagnosis seemed to be bacterial endocarditis. Dr. W. H. Grace, of Chester, kindly examined the film and found it to be typical of myeloid leukaemia, from which disease the patient eventually died. In spite of the fact that the leukaemia, which must have been present during the pregnancy, was not treated at that time, I cannot recall any abnormality of the infant. The woman was admitted for a time to the Royal Infirmary at Chester, where I am sure any investigator will find more adequate details than my memory can supply.—I am, etc.,

High Wycombe. G. S. W. EVANS.

Danger of Mixed Anaesthetics

SIR,—It would seem, from a study of some recent articles on anaesthesia and from conversations with colleagues, that the practice of mixing thiopentone and a relaxant in the same syringe prior to administering them as an anaesthetic is becoming widespread. As almost the sole advantage of this technique is its convenience to the anaesthetist, I should like to present the arguments which operate against it. When any drug is exhibited the safest possible method should be used, and only techniques which allow the operator to judge the signs of possible overdosage, and to take steps to prevent it, are admissible. Dr. T. C. Gray and others, whose experience of relaxants is greatest, stress the necessity of a test dose, and while as yet the percentage of subjects sensitive to relaxants is not known, the literature already contains records of deaths which have occurred when this precaution was neglected, to say nothing of other cases which have survived only after prolonged and energetic resuscitation.

When the thiopentone-relaxant mixture is used, the test dose is rarely given, and if given loses most of its value, because, since the cardinal sign of overdosage of either thiopentone or curare is apnoea, each may mask the effect of the other to such an extent that it is impossible to judge the effect of either drug on the patient with any accuracy. Under such conditions overdosage becomes fatally easy. In addition, users of a thiopentone-relaxant mixture are, in effect, acting on the belief that there is an exact thiopentone-relaxant equivalent—e.g., 15 mg. D-tubocurarine chloride ≡ 0.5 g. thiopentone. This is simply not true, as users of these drugs can testify, and the fact that on a number of occasions such a mixture has been successfully used cannot be accepted as upholding that belief, for if the exceptions are as rare as even one in two hundred cases, these should be sufficient to rule it out.

It is suggested that when it is intended to use a relaxant with thiopentone, or indeed any other anaesthetic agent, the greatest margin of safety is obtained only if (*a*) a test dose of relaxant is invariably given, since at worst no harm is done, and at best, where the patient is sensitive, valuable information is obtained, and (*b*) the full dose of relaxant is administered separately and after the anaesthetic agent, so that the anaesthetist can judge the effect of each on the patient.

Anaesthetists have been called—among other things—"the guardians of sleep." If they use techniques other than the safest, surely their proud motto "In somno securitas" can be called in question and yet another question posed in its place: "Quis custodiet ipsos custodes?"—I am, etc.,

London, W.12. J. ANSTRUTHER SMITH.

Collapse During Spinal Analgesia

SIR,—I read the letter from Drs. E. H. Winterbottom and J. W. Dundee in your issue of August 26 (p. 527) with great interest. The last paragraph, however, gives me cause for thought and great difference of opinion. I agree that there was much argument against the use of spinal analgesia in this case, but why, if general anaesthesia were chosen as an alternative, should it be assumed to be necessary to intubate and use intratracheal methods? Auricular fibrillation could just as easily have been initiated by intubation, as they say, and I can see no reason for thus complicating a general anaesthetic in a case for relief of urinary obstruction.—I am, etc.,

Orpington. ERIC A. SCOTT.

Methyl Bromide Poisoning

SIR,—The case of methyl bromide poisoning reported by Drs. A. C. MacDonald, I. C. Monro, and G. I. Scott (*Journal*, August 19, p. 441) prompts me to record the case of a man who was in my care last year.

The patient was a "spiv" who stole some 200 R.A.F. methyl bromide fire extinguishers from a storage depot. While unloading these from his lorry one went off in his face and he felt temporarily overcome by the fumes. Between two and three hours later he felt his hands shake and then collapsed quite suddenly. He was admitted to a hospital, where he was unconscious for four days. The cause of his collapse was only discovered following police investigations.

After four weeks he was discharged from hospital but complained of weakness and jumping in his arms and legs. Ten weeks later, as there were no discoverable organic causes for his symptoms, he was referred to a psychiatric out-patient clinic, where I first saw him, and he was later in my care in a neurosis unit for some weeks. The symptoms were of a hysterical nature and were susceptible to suggestion, but at first it was necessary to persuade the man to face the police charge that was awaiting him. In court the Recorder said that the patient had already suffered enough, and he was put on probation. Following a slight relapse in his weakness he then improved with superficial psychotherapy and was soon fit for work.

An interesting feature of the case was that while in hospital for treatment of the neurosis he had a typical grand mal seizure. This was witnessed by an experienced male nurse who has observed many epileptics, and I have no doubt that it was a genuine epileptiform convulsion. There was no history of any previous attack (even during the acute stage of the methyl bromide poisoning), and unfortunately the patient took his discharge soon after this so that further observation was denied us.

My attempts at follow-up of this patient have been unsuccessful, but over a year after leaving hospital he was seen by a nurse who had known him in hospital, and he appeared to be maintaining normal health.—I am, etc.,

Co. Durham. JOHN A. EWING.

Pyloric Stenosis in a Premature Infant

SIR,—Congenital pyloric stenosis is regarded as a well-defined entity and has been widely reviewed in the literature. The following case report is of interest chiefly because the patient was a premature infant presenting the classical signs of congenital pyloric stenosis.

In 1925 Weeks and Brooks reported a premature infant with pyloric stenosis weighing 4 lb. (1.8 kg.) at operation. Gallagher, in 1937, reported a case of pyloric stenosis occurring in a coloured female infant which weighed 3 lb. 8¾ oz. (1.6 kg.) at birth. The mother was delivered by caesarean section because of nephritic toxaemia. In this case the infant did well until the 28th day, when vomiting commenced and typical signs of pyloric stenosis were noted. A Ramstedt operation was performed, but the wound did not heal by first intention and resuturing was necessary. Vickers and Conrad

(1940) also reported a case of an infant weighing 4 lb. at birth. Signs and symptoms of pyloric stenosis developed when the infant was one month old. The infant weighed only 3 lb. 12 oz. (1.7 kg.) at operation, which was successfully performed. The wound broke down on the 10th day after operation, but final recovery was complete.

Case Report.—An apparently healthy female infant was born at Staincliffe General Hospital, Dewsbury, on November 24, 1949. The mother had had three previous pregnancies, two of which had resulted in premature births and one in a miscarriage. There was no history of pyloric stenosis in the two living children. With the present pregnancy there was evidence of toxaemia, but delivery was spontaneous and normal. At birth the infant weighed 4 lb. 6 oz. (1.9 kg.) and had a crown-heel measurement of 17 in. (42 cm.). The mother's menstrual history was vague, but it was estimated that the infant was born at about the 36th week of gestation. The infant did well until the 15th day, when she began to regurgitate feeds. Gradually the vomiting became more copious and forceful, and stools became infrequent and dry. She was hungry for her feeds but began to lose weight. On the 19th day a definite abdominal mass with the characteristics of a pyloric tumour was felt, and weak peristaltic waves were visible. A diagnosis of congenital pyloric stenosis was made, and "eumydrin" was given before each subsequent feed. However, she did not improve and vomiting persisted.

On the 21st day a Ramstedt operation was performed. At this time the infant weighed 4 lb. 1 oz. The operation was performed under local analgesia, and a well-marked hypertrophy of the pylorus was found. No particular difficulty was encountered at the operation. Recovery was uneventful and the wound healed well by first intention. She was discharged from the hospital 3½ weeks after operation, when she weighed 6 lb. 13¼ oz. (3.1 kg.).

—We are, etc.,

CYRIL JOSEPHS.
R. W. HENDRY.

Dewsbury.

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The Training of Pathologists

SIR,—It was with considerable interest that I read of the recommendations of the committee set up by the Royal College of Physicians "to inquire into the training and recognition of medical specialists in pathology, and to make recommendations concerning this branch of medical practice in the future" (August 26, p. 515). Having been actively engaged in the teaching of pathology for almost twenty years I write to point out a condition which should apply to all pathologists-in-training.

I consider it imperative that the fundamental principles of pathology should be assimilated and inculcated correctly, systematically, and thoroughly from the very outset, and not left, as is implied in the annotation on the report, until the third, fourth, or fifth year when the trainee is in a university or associated department and free from routine responsibilities. As a consequence, the recommended generous provision of posts in hospital laboratories, and in the departments of clinical pathology of universities and teaching hospitals, must be such as to permit candidates specially selected for training to be free or relatively free from routine responsibilities in the first or first and second years of training. This would enable all trainees systematically to acquire considerable competence and experience of laboratory methods in each of the four divisions of pathology within a two-year period, and at the same time to make some study of the four subjects in selected and supervised reading. By this means candidates would receive a good grounding in pathology and be the better able to profit from the three succeeding years of study in which a selected subject or one of special interest could form the basis of individual investigation and study suitable for presentation as the thesis for a higher degree.

This point is stressed because, unless first- and second-year trainees are appointed *supernumerary* to departmental establishment in hospital laboratories selected for training, those in training would be employed mainly or wholly in repetitive routine work and would learn little of the fundamentals of their subject and perhaps only a limited repertory of technical methods. As a corollary, it is important that the medical staff of departments of pathology selected for teaching, in hospitals other than teaching hospitals, should be adequate to allow the senior members time in which to teach all juniors systematically. Such an arrangement would, in the end, more than justify the expense of the salaries paid out for little immediate return, other than, say, resident alternate night duty required of trainees.

When, in the future, conditions become more stabilized it should be possible for the university departments of pathology to be responsible for the initial period of postgraduate training and provide, in a two-year course, a curriculum similar to that at present followed for one year at the Postgraduate School for the Diploma in Clinical Pathology (University of London). The additional year would permit of methods being learned less hurriedly and practised more frequently, and at the same time allow of related systematic reading. Such university postgraduate courses in pathology for all trainees should not be regarded as the ideal and the unattainable, but rather as the best and essentially economic means of providing well-trained pathologists in this country.—I am, etc.,

London, N.18. J. F. HEGGIE.

Vaccination and Inoculation Certificates

SIR,—In your issue of July 22, p. 215, you publish a letter from Sir Philip Manson-Bahr referring to the inconvenience caused by regulations regarding vaccination and inoculations. This draws attention to an important international matter at present being studied by the World Health Organization. It is proposed next year to replace the various present international sanitary conventions with new international health regulations. An opportunity is thus given to place medical supervision of international trade and travel on a more scientific basis and so reduce the present too frequent obstruction it offers to free international movement. In this respect, however, the draft of the new regulations already circulated to governments for comment is not reassuring. If these regulations are adopted they will still provide nervous or officious health authorities with ample scope for demanding excessive immunization certificates, medical examination, and isolation of passengers and crews, and the holding of ships, aircraft, and land transport, all in the name of disease prevention. It is not possible in a letter to indicate how doubtful many such quarantine barrier methods are as a means of preventing the introduction of disease. My own opinion is that there is scarcely any measure of the quarantine barrier type which is practical or justifies the serious obstruction given to international trade and travel. I have given this view in an article in the *Journal* (1948), **1**, 1092, from which I should like to quote the summary:

> Much medical interference in world traffic still exists in spite of the advance in international sanitary legislation. This partly arises out of the increasing demand for travellers to hold vaccination certificates and to submit to medical examinations, and partly to medical interference with shipping and aircraft. Arguments are put forward [in the paper] suggesting that such restrictive quarantine medical practice is of limited value and is dangerous in creating a false sense of security. It cannot guarantee exclusion of infection and is no protection against the recrudescence of endemic disease. It leads to the neglect of more valuable internal measures for improving medical organization and sanitary conditions. It also contributes to inter-territorial friction.
>
> There is thus a need for the international sanitary conventions now being revised to reduce "police" measures, to emphasize national self-reliance and responsibility, and to clear the way for better national health services and world transport less shackled with medical restrictions.

—I am, etc.,

Capetown. H. S. GEAR.

A Dromedary has One Hump

SIR,—I should like to ask if any reader of the *Journal* can explain the employment of the dromedary to describe the temperature chart in anterior poliomyelitis? Dr. W. Howlett Kelleher in his authoritative article (September 2, p. 571) follows current textbooks in making it appear that the term is intended to describe a two-humped chart.—I am, etc.,

Broadstairs. BRIAN WEBBER.

Lung Cancer and Petrol Lighters

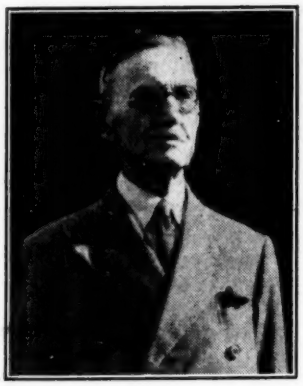
SIR,—If the use of petrol lighters is to be considered as a possible cause of lung cancer, as suggested by your correspondent Dr. R. W. Ironside (August 26, p. 529), what about paraffin-impregnated matches?—I am, etc.,

Birmingham, 3. B. R. SANDIFORD.

Obituary

HERBERT MORLEY FLETCHER, M.D., F.R.C.P.

Dr. Morley Fletcher, consulting physician to St. Bartholomew's Hospital, died at his Sussex home on September 9, in his eighty-sixth year. Although he had lived for years in retirement in the Sussex village of Petworth, Dr. Morley Fletcher will be remembered not only by a host of his Harley Street neighbours and others but by a large number of young and middle-aged members of the medical profession who worked under him as clinical clerks and house-physicians or met him in the examination-room. He was examiner in medicine for Cambridge, Durham, Manchester, Sheffield, and Glasgow Universities, Queen's University, Belfast, and the National University of Ireland, also for the Conjoint Board and the Society of Apothecaries, so that a large proportion of entrants into medicine must have been examined by him. He had the gift of rapidly assessing the quality of an individual and measuring his attainments, and was never misled by pretentiousness or superficial brilliance.



Herbert Morley Fletcher was born in 1864 at Huyton, in Lancashire, the son of Alfred Evans Fletcher and Sarah, daughter of Richard Morley, of Leeds. His younger brother was Sir Walter Morley Fletcher, the first secretary to the Medical Research Council, who died in 1933. Herbert was sent to Mill Hill School, and then to Trinity College, Cambridge, where he took his B.A. in 1887. At Cambridge, like his brother, he shone not only in natural science but also as an athlete. He was elected president of the Cambridge University Athletic Club in 1888, and to a good age he was adept in many kinds of outdoor sport. Few men have kept their youthful appearance and carriage so long after middle life. He received his medical training at St. Bartholomew's, qualifying in 1890, and proceeding M.D.Cantab. in 1893. He completed his studies at Freiburg and Vienna.

Morley Fletcher's reputation as a consultant in general medicine, and especially in children's diseases, quickly grew. In 1904 he was appointed to the staff of his old hospital, St. Bartholomew's, of which in due time he became senior physician and on his retirement in 1929 consulting physician. He was also vice-president of the Medical College. Other hospitals with which he was associated were the East London Hospital for Children, Queen Charlotte's, the Alexandra Hospital for Diseases of the Hip, the Florence Nightingale Hospital, the Infants' Hospital, and the Bushey Heath, Hertford County, and Royal Buckinghamshire Hospitals. He was also a member of the consulting staff of the Convalescent Home for Officers at Osborne, Isle of Wight, honorary physician to the Metropolitan Convalescent Institution, and a member of the Medical Consultative Board of the Navy. In the war of 1914–18 he served as major, R.A.M.C.(T.). In 1933 he was appointed by the Government a member of the Advisory Committee concerned with the administration of the Cruelty to Animals Act.

He was a prominent figure in the Royal College of Physicians of London, becoming eventually Senior Censor. He took the Membership of the College in 1891 and was elected a Fellow in 1900. At one time he was president of the Section of Medicine of the Royal Society of Medicine and at another president of the Section of Diseases of Children. He had also been president of the British Paediatric Association and honorary secretary of the Association of Physicians. The Royal Australasian College of Surgeons made him an Honorary Fellow, and in 1937 Queen's University, Belfast, conferred on him the honorary degree of LL.D. The Marquess of Londonderry, Chancellor of the University, in bestowing the degree, described him as having one of the most acutely critical minds in medicine. "His detection of error is exercised not only on scientific hypotheses but also on conjectures contained in the type of monographs whose utility is most doubted by their authors." This ceremony took place during the British Medical Association meeting at Belfast, where Dr. Morley Fletcher was president of the Section of Diseases of Children. In 1894 he published a translation of C. van Kahlden's *Method of Pathological Histology*. He contributed the article on biliary cirrhosis in Allbutt and Rolleston's *System of Medicine* and on diseases of the peritoneum, liver, and pancreas in Garrod, Batten, and Thursfield's *Diseases of Children*. He was a frequent contributor to the *Practitioner*, and his writings were authoritative and widely quoted.

He was twice married: first to Ethel Frances, who died in 1918, daughter of the late Joseph Crossley, of Halifax, by whom he had two sons and three daughters; one of his daughters of this marriage is the wife of Mr. H. U. Willink, K.C. His second marriage was to Mary Christina, sister of Mr. H. U. Willink, by whom he had two daughters.

A former house-physician writes: "Morley," as we always called him, gave one the impression of being a bit aloof. But to become his house-physician was to become his friend and colleague. It was only after one had left Bart's that one realized how tolerant he had been to youthful arrogance. He treated his house-physicians as equals who were sharing with him the common task of looking after the sick. "It might be worth while trying such-and-such a drug," was his method of instruction: you received the instruction in the form of a consultation, and this was enormously encouraging.

Morley Fletcher was a sound clinician of the older school. He kept himself up to date with recent advances in medicine without ever surrendering his judgment of a case to the compilers of reports on special investigations. He was always courteous and urbane, and to be on "Morley's" firm as clerk and house-physician was a very happy experience. That very remarkable figure in charge of his male ward, Sister Hope (Miss Powell), used to say: "One can get very cross with Dr. Fletcher, but as soon as he smiles you are disarmed at once." One amusing characteristic of him was that once he had made up his mind that certain of your experiences had followed a certain pattern it was difficult to convince him of error in one or two particulars: he held fast to his own version.

About a year ago he said he thought he had shrunk a bit, but he still held his slim, trim figure as erect as ever. Morley Fletcher was a connoisseur in those things that make for the fuller life. To all who knew him well he was a lovable person, and they will hold his memory in great affection.

Dr. ERNEST VILLIERS HUNTER, of the Church Missionary Society, Uganda, died suddenly on July 29 at Nairobi aged 73 years. As a young man he worked as a missionary in India, but after a time he decided to become a doctor, and he qualified in Ceylon in 1903. After qualifying he held a number of medical posts, being at one time in charge of a leper colony in India. At the beginning of the first world war he joined the R.A.M.C. and was posted to Gibraltar. On demobilization he took up general practice in Worcestershire, but two years later he responded to an appeal from the Church Missionary Society for a doctor to work in Uganda. For some years he worked at Ngora, where he founded and built the Freda Carr Hospital. In 1939 he took charge of the Mengo Hospital. During the difficult war years his gifts of resource and practical common sense were of great service to Mengo. He did much to modernize and improve the hospital. On his retirement in 1942 his services to the Protectorate were marked by the award of the O.B.E. He continued to serve the Church Missionary Society in an advisory capacity up to the time of his death. Dr. Hunter was a man who was valued and respected by a wide circle of friends of all races. As a doctor he showed great shrewdness, wisdom, and skill. He was eminently a practical man and could turn his hand to many things. His deeply rooted Christian faith was the mainspring of his entire life and character. The last year of his life was clouded by the death of his wife, who had been so closely united with him in all his aims and activities, and also by the loss of his only son. His own death came at a time when he felt that his life's work was done, and he was buried, as he would have wished, in African soil.—W. R. B.

Dr. JOHN VINCENT BATES, of West Malling, Kent, died suddenly on August 14 at the age of 58, while attending a meeting at the West Kent General Hospital. Dr. Bates was educated at Highgate School, Pembroke College, Cambridge, where he was a scholar and where he obtained first-class honours in the Natural Sciences Tripos in 1913, and University College Hospital, where he gained the Goldsmid Exhibition. He qualified in 1915 and at once joined the R.A.M.C., serving in France with a battalion of the Black Watch. At the Battle of the Somme, in 1916, he was awarded the Military Cross. He served in France until he was wounded in 1917, when he was posted to the Military Heart Hospital at Colchester. On demobilization he took the M.A. and M.B. and B.Ch. degrees of Cambridge University, and subsequently became house-physician at University College Hospital and house-surgeon at the Leicester Royal Infirmary, finally entering general practice as partner in a large practice at West Malling. In this practice he was medical superintendent of the Malling Isolation Hospital and medical officer to the Aylesford Paper Mills and Holoplast, Ltd., and was the well-loved friend and adviser of a large number of patients, who will mourn his passing. Shortly after coming to West Malling he was gazetted to the 131st (H.C.) Field Ambulance and eventually commanded the unit, retiring with the rank of brevet-colonel. Dr. Bates was a member of the B.M.A. since 1919, was chairman of the Maidstone Division from 1944 to 1947, and was Representative of the Division at the A.R.M. in Cambridge in 1948. He was a member of the Kent and Canterbury Local Medical Committee and of the management committee of the Mid-Kent group of hospitals. He leaves a widow and two sons, both of whom have followed him in the profession of medicine. The sympathy of a large circle of friends and colleagues will go out to his family.

Dr. BERTRAM HENRY BARTON died on August 16 after a long illness at the age of 67 years. He was educated at Chatham House, Ramsgate, and in medicine at St. Bartholomew's Hospital, where he qualified in 1906. He graduated M.B. in 1908 and proceeded M.D. in 1910. After holding house appointments at the Seamen's Hospital, Greenwich, the Royal Hospital, Portsmouth, and the Hospital for Sick Children, Great Ormond Street, he became a general practitioner in Harrow, where he worked until his retirement about three years ago. During the first world war he was in the R.A.M.C., serving in France with front-line troops for a long period. He was awarded the M.C. for his outstanding work in a field-dressing station. As a general practitioner he was much beloved by his patients and held in great esteem by his brother practitioners. He was on the staff of Harrow Hospital for many years as a general practitioner and gave much of his time to giving anaesthetics there. During the second world war he did E.M.S. work at the same hospital. He was a keen member of the B.M.A. from 1910, and chairman of the Harrow Division in 1926–7. In 1941 he represented Harrow at the Annual Representative Meeting in London. By his death the district of Harrow has lost one of its most loyal and devoted general practitioners, for he was a man who devoted his time and attention whole-heartedly to his profession.—H. E. T.

Mr. EDWARD GILLESPIE, for many years a member of the surgical staff of the Prince of Wales General Hospital, Tottenham, died at Bishop's Stortford on August 22. He studied medicine at Glasgow and graduated M.B., Ch.B. in 1900. After working as a house-surgeon at the Western Infirmary he left Glasgow and held a number of hospital posts while studying surgery. He was admitted F.R.C.S.(England) in 1907. Gillespie became surgical registrar at the Prince of Wales Hospital after working there as a house-surgeon. Before long he was elected an assistant surgeon, and thereafter he rose steadily until he became senior and, comparatively recently, consulting surgeon of the much enlarged hospital. He also soon came to be associated with the Enfield Cottage Hospital, which later became the enlarged Enfield War Memorial Hospital. During the first world war he held a number of surgical posts in France and in England: two of the most important were at Tréport and at the Tooting Orthopaedic Hospital. At the beginning of the second world war he joined the E.M.S. and was appointed to the Haymeads Emergency Hospital at Bishop's Stortford. He retired shortly after the end of the war, but continued to live at Bishop's Stortford.

Dr. C. F. Hadfield writes: The announcement of the death of Edward Gillespie may well have escaped the notice of the many hundreds of patients alive to-day who owe their existence to his skill and care. Perhaps the fact that I knew and worked with him for more than forty years may be deemed a valid excuse for attempting an appreciation of a man whom I, with no small experience, regard as one of the most able and skilful surgeons whom it has been my privilege to assist. While studying in Glasgow he came much under the influence of Sir William Macewen. Although anything but a hero-worshipper, and in fact apt to be somewhat censorious of the work of himself and others, he was never tired of praising the abilities of that great surgeon and admitting his indebtedness to his teaching. How exactly he became house-surgeon at the Prince of Wales Hospital, which was to take such a large part in his subsequent life, I do not know, but when I first met him in 1908 he was already surgical registrar there and working under, among others, that fine old type of general-practitioner surgeon, Mr. Hooper May. For very many years quite a proportion of Gillespie's private and hospital work was connected with Enfield, and he became the trusted adviser in more than surgical matters to many of the general practitioners of that neighbourhood. During this period he did not only the routine surgical work of the Enfield Cottage Hospital but also all the emergency operations, and he never seemed to resent the innumerable night calls there from the West End. Another of his appointments was that of surgeon to the Tottenham Hotspur Football Club. In this I was usually associated with him, and I should hesitate to say how many potential football teams we dealt with. I again had the privilege of working in close co-operation with him at the Haymeads Emergency Hospital. At first the staff was a rather shifting one of younger surgeons, some of whom perhaps did not quite understand why their senior should be a surgeon whose name they scarcely knew. It was, however, interesting and even amusing to those of us who knew him to notice how rapidly and without any effort on his part they came to seek his advice and to acknowledge his superior judgment and skill. He quickly attained an outstanding position not only in the hospital but in the surrounding neighbourhood for his surgical skill, his wisdom, and the trust he inspired. It is in fact at the special request of a number of his Haymeads

colleagues that I have attempted to write this brief appreciation. During the war years his work at the hospital was twice seriously interrupted by severe attacks of coronary thrombosis, but after each of these he returned to his work with unimpaired abilities and continued to perform gastrectomies and other severe operations with unaltered success. Although a diligent student and critic of surgical literature, he himself wrote little and seldom took active part in formal discussions, though in private consultations his opinions were decided and trenchantly expressed. He was a keen sportsman and in younger days played much tennis. He was fond of golf, and, though never of the first class, he could up to the last usually give points to most of his house-surgeons and colleagues. Though his friends who remain will miss him sadly, we can rejoice that he was spared any long and tedious period of slowly diminishing physical and intellectual activity.

Dr. JAMES FRANCIS BLACKETT, for twenty-five years medical officer of health of the city of Bath, died at his home on August 30 after a brief illness at the age of 69 years. Though on the retired list, he was happily active up to the end, just having returned from doing relief duty for an old friend who had been on holiday. A student of the Bristol Medical School, he graduated M.B., B.S.(London) in 1906, proceeding to the M.D. in 1909. Two years later he also obtained the M.D. of Bristol University. James Blackett was an able student, obtaining the Lady Haberfield and the Clarke and Sanders Scholarships, as well as the committee gold medal of the Bristol Medical School. After a period as house-physician at the Bristol General Hospital he went into general practice for a few years. During the first world war he served as a captain in the R.A.M.C. In 1917 he turned to the public health field, and after obtaining the D.P.H. at Bristol he became assistant medical officer of health in the borough of Swansea. In January, 1920, he was appointed medical officer of health and school medical officer of his native city of Bath, a post which he held until his retirement in 1945. During his term of office Blackett was a pioneer in the development of the health services, being closely associated with the reconstruction of the City Isolation Hospital, the building of the Bath and Wessex Children's Orthopaedic Hospital, and Winsley Sanatorium. For thirty years he was honorary treasurer of the West of England Branch of the Society of Medical Officers of Health, and he was an active member of the B.M.A., representing the Bath Division at the annual meeting in 1923, and serving as chairman of the Division in 1930–1. Few people were privileged to know Blackett intimately, but those who did found in him a loyal friend and interesting companion. Studious and retiring by nature, he had a great interest in many subjects, apart from his chosen profession. Archaeology was a particular hobby, and at week-ends he was frequently to be seen cycling through the byways of Somerset in search of fresh knowledge. After his retirement he was able to enjoy his hobbies to a greater extent, travelling further afield on the Continent. His brain was as active and eager as ever, much of his time being devoted to recording the history of the development of public health services in Bath during the last fifty years. Happily he was able to complete this work, and in 1949 the University of Bristol awarded him the degree of M.A. for his thesis on this subject. Blackett was one of those who possessed in high degree the qualities of loyalty, thoroughness, and integrity—qualities which are so needed in public life to-day. He will be sorely missed by those of his staff to whom he also accorded the privilege of friendship. His wife died in 1941, but he leaves a son and daughter, to whom the sympathies of his friends and colleagues are extended.—B. A. A. W.

The Ministry of Health announces that gifts of blood to hospitals in England and Wales through the National Blood Transfusion Service totalled 125,956 during the first three months of this year—the highest number since the war. Over 23,600 more donors joined the Service in the quarter, bringing the total strength up to 377,704. Another 220,000 donors are needed to keep ahead of the steadily increasing demands of hospitals and to reduce calls on the individual donor.

Medico-Legal

NATIONALIZATION AND CHARITY

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Another Chancery case recently gave the court an opportunity further to trace the dividing line between charities and State-owned institutions under the National Health Service, and to define the effects of the new legislation on bodies that have hitherto been governed by the principles of equity relating to charitable trusts. It decided that teaching hospitals are still charities and therefore suitable objects of bounty; and also that the Royal College of Surgeons is a charity.

The late Lady Bland-Sutton bequeathed funds to the National Provincial Bank, as executor and trustee of her will, to be applied as follows. The Royal College of Surgeons was to have £300 a year, free of tax, to maintain a Bland-Sutton Research Scholarship in its Bernhard Baron Laboratories, and the residue was to go each year to the Middlesex Hospital for the maintenance and benefit of the Bland-Sutton Institute of Pathology already in existence. But she attached a condition to this gift. If ever the institute should cease to be carried on as a pathological research institution, or if its name should be changed, or if the Middlesex Hospital should become nationalized or by any means pass into public ownership, or if the bank should become unable lawfully to apply the income for those purposes, then it was to transfer the capital and income of the endowment fund to the Royal College of Surgeons absolutely for the College's general purposes. In 1943, when her will was proved, the fund amounted to some £23,000, and down to July 5, 1948, when the National Health Service Act came into force, it was duly applied according to her will. After that date, however, the bank felt doubt concerning the effect of the Act, started to accumulate the income other than that required for the scholarship, and moved the court to determine whether the gift to the College was valid.[1]

Two important points arose for decision: whether the Middlesex Hospital had become nationalized and passed into public ownership, and whether the Royal College of Surgeons was a charity. On the first point, Mr. Justice Danckwerts stressed that the Middlesex is a teaching hospital for the purposes of the Act, and that when the Act came into force the Bland-Sutton Institute of Pathology was part of a medical school. By Section 6 of the Act all the premises and movable property of the hospital were transferred to the Minister of Health free of any trust; but by Section 7 all endowments of a teaching hospital were transferred to the board of governors constituted under the Act, and by Section 8 (1), where a medical or dental school is associated with a hospital which is transferred to the Minister under Section 6, property held solely for the purposes of that school is not affected, and those purposes are not to be deemed to be purposes of the hospital.

This provision seemed to the judge to take the property held for the purposes of the medical school of the hospital, including the Bland-Sutton Institute of Pathology, out of the provisions of the Act transferring property of hospitals to the Minister. By Section 8 (2) the property of a medical school of the University of London is transferred to the school's governing body. By the scheme submitted by the old council of the medical school and approved by the university, the council became incorporated and the property vested in it. The judge took the view that the governing body and the property had neither been nationalized nor passed into public ownership; the Bland-Sutton Institute of Pathology and its work continued in existence, though administered by a differently constituted body, and the bank might lawfully apply the income of the endowment fund for the purposes of the institute.

This ruling disposed of any right of the Royal College of Surgeons to the residue, but before giving it the court went deeply into the question of the legal standing of the College.

[1] *Re* Bland-Sutton's Will Trusts. 1950, 2 All E.R. 466.
[2] *Re* Royal College of Surgeons of England. 1899, 1 Q.B. 871.
[3] Customs and Inland Revenue Act, 1885, s. 11.

The right of the College depended on whether it is a charity at law, and a major obstacle to this view was a previous decision of the Court of Appeal in an unsuccessful claim by the College to be exempted from the tax on corporate and unincorporated bodies.[2 3] The argument before the court on that occasion had proceeded entirely on the question whether the property or income of the College was appropriated and applied solely for the promotion of science; and the court held that this condition was not satisfied.[4] Its reason was that the College had two main objects: promotion of the science of surgery, and promotion and encouragement of the practice of surgery and the interests of those practising or about to practise it; and the second of these objects disqualified it for exemption. The Chancery judge, however, now held that, in considering whether a particular society is a charity for the purposes of a gift in a will, the test is whether the objects of the society are really charitable, notwithstanding that their carrying out might incidentally produce benefits to its members. The motives of the members of a society on joining it are not material. Counsel for the College urged that the art and science of surgery are essentially a practical art and science, and cannot be promoted without practice and experience, which can be carried out only by means of a competent body of practitioners whose labours are intrinsically directed towards the cure or alleviation of the ills of mankind. The judge found great force in that argument, and considered himself free to hold that the real object of the College was the promotion and encouragement of the art and science of surgery and not the interests of surgeons. The earlier decision did not prevent him from so doing, as it concerned a particular statute and was directed to different considerations. This present judgment, though it did not help the College in its immediate object of securing the Bland-Sutton residue, may prove of great help on some future occasion.

Universities and Colleges

UNIVERSITY OF EDINBURGH

The Faculty of Medicine of the University of Edinburgh has announced the following Macarthur postgraduate lectures to be delivered by Mr. Norman C. Tanner, F.R.C.S., Senior Surgeon, St. James's Hospital, Balham, S.W., in the Surgery Lecture Theatre, University New Buildings, Edinburgh, at 5 p.m. on each day: Monday, October 9, "The Indications for Surgery in Peptic Ulcer"; Tuesday, October 10, "Operative Methods in the Treatment of Peptic Ulcer"; Wednesday, October 11, "Treatment of the Complications of Peptic Ulcer." Dr. Philip S. Hench, Mayo Clinic, Rochester, Minnesota, U.S.A., will deliver a Macarthur postgraduate lecture on Friday, October 13, at 5 p.m., in the Anatomy Lecture Theatre, University New Buildings, Edinburgh. His subject is, "The Present Status of Cortisone and A.C.T.H. in General Medicine." Senior students and graduates in medicine are cordially invited to attend these lectures.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

At a meeting the Royal Faculty of Physicians and Surgeons of Glasgow held on September 4, with the Visitor, Mr. Walter W. Galbraith, in the chair, the following were admitted Fellows of Faculty *qua* Physician: J. Colvin, R. J. Cuthbert, J. C. C. Kelly, R. J. McWilliam, S. S. Meighan, jun., J. McC. Murdoch, G. B. Shaw.

SOCIETY OF APOTHECARIES OF LONDON

Dr. Frank Howitt has been elected Master of the society and Dr. G. Roche Lynch and Sir Wilson Jameson Wardens. Sir Cecil Wakeley has been reappointed as the society's representative on the British Postgraduate Medical Federation for a further year.

The diploma of Mastery of Midwifery has been conferred upon Dr. Hugh F. Powell, *honoris causa*.

The following have been granted the diploma of L.M.S.S.A. upon examination: P. A. Van Der Merwe, A. H. R. Hewett-Clarke, W. B. Wright, P. E. E. Kann, M. K. Mangan, M. el K. A. Tarshouby, L. Tippett, C. E. Law, A. J. Rowe, W. C. Snoek, H. C. Killey, N. L. Rowe, D. G. Bluett, D. L. Hadley, T. G. Scott, R. A. Davidson, W. H. Bexon, A. Gordon, P. H. I. Parsons, B. Kay, R. N. Pearson, J. M. Hayman, G. T. Gould, R. E. Hazell.

No. 34

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended August 26.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1950 (a)	(b)	(c)	(d)	(e)	1949 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Meningococcal infection	18	3	16		1	18	2	16	2	—
Deaths		—	—				—	—		
Diphtheria	41	3	21	2	2	52	6	25	—	3
Deaths	—	—	—	—	—	1	—	—	—	—
Dysentery	137	7	86		—	90	10	68	1	—
Deaths		—			—				—	—
Encephalitis, acute	3	2	—		—	2	—	—	—	—
Deaths		—		—			—			
Erysipelas			20	4	4			17	8	5
Deaths							—			
Infective enteritis or diarrhoea under 2 years				23	8				74	
Deaths	11		3	2	—	28	2	3	9	—
Measles*	4,277	316	79	64	26	1,778	120	75	68	41
Deaths†			—	—	—			—	—	—
Ophthalmia neonatorum	34	2	6		—	38	2	8	—	—
Deaths										
Paratyphoid fever	10	1	3 (B)		—	25	3	—	7 (B)	—
Deaths	—		—		—	—	—	—	—	—
Pneumonia, influenzal	177	10	—	2	2	222	9	—	—	12
Deaths (from influenza)‡	1	1	—	1	—	3	—	1	1	—
Pneumonia, primary			98	¶				74	19	
Deaths	121	21		2	7	122	20		3	7
Poliomyelitis, acute	589	42	86	5	18	280	34	9	—	1
Deaths§	40	2		—		20	4			
Puerperal fever		—	6				—	5		
Deaths										
Puerperal pyrexia‖	85	10	7	1	—	91	7	9	—	—
Deaths							—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	635	50	137	27	37	718	53	131	40	59
Deaths†			—	—	—			—	—	—
Smallpox	—	—	—		—	—	—	—	—	—
Deaths					—				—	—
Typhoid fever	11	3	3	—	1	10	1	1	4	—
Deaths	—	—	—		—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths					—				—	—
Whooping-cough	3,725	354	238	80	31	1,671	79	66	69	72
Deaths	6	2	—	—	—	3	1	—	—	—
Deaths (0–1 year)	165	24	29	13	3	260	35	32	30	11
Deaths (excluding stillbirths)	3,968	615	484	134		4,054	648	517	144	88
Annual death rate (per 1,000 persons living)			9·7		99			10·4	8·9	
Live births	6,681	1090	844	433		7,297	1143	866	410	227
Annual rate per 1,000 persons living			17·0		20·0			17·4	25·4	
Stillbirths	180	22	24			189	14	33		
Rate per 1,000 total births (including stillborn)			28					37		

* Measles is not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

¶ Primary pneumonia no longer notifiable in Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

Notifications of poliomyelitis in the week ending September 2 were: paralytic, 302 (369); non-paralytic, 189 (220); total, 491 (589). The figures for the previous week are shown in parentheses. The total decrease compared with the preceding week was 98, of which 67 were paralytic and 31 non-paralytic. Non-paralytic cases in the week under review comprised 38.5% of the total. The uncorrected notifications for the corresponding week in 1947, 1948, and 1949 were 657, 73, and 308 respectively.

The only counties showing more than average increases for the week under review were Kent and the West Riding of Yorkshire—10 and 7 respectively more than in the preceding week. Material decreases in notifications occurred in London 12, Kesteven (Lincs) 15, Middlesex 7, Surrey 14, Warwick 9, Worcester 7, and East Riding of Yorkshire 7.

The following county areas have notified no cases in the four weeks up to September 2—Cambridge, Suffolk West, Cardigan, and Radnor. In the same period the following contributed 1 case only: Isle of Ely, Soke of Peterborough, and Anglesey.

Discussion of Table

In *England and Wales* a decrease occurred in the number of notifications of measles 1,252, whooping-cough 214, and acute pneumonia 56, while a rise was reported for acute poliomyelitis 39, scarlet fever 21, and diphtheria 10.

A further large fall occurred in the incidence of measles, and the number of notifications are now less than one-half what they were six weeks ago. The largest declines during the week were in Lancashire 219, Lincolnshire 185, Middlesex 84, and Yorkshire West Riding 81. The largest fluctuations in the local trends of whooping-cough were a rise of 38 in Hertfordshire and a fall of 38 in Southampton. The only variation of any size in the incidence of scarlet fever was a rise of 24 in the number of cases notified in London. The chief features of the local returns of diphtheria were rises of 3 in London and Kent.

The largest returns of dysentery were from Lancashire 36 (Southport C.B. 11, Oldham C.B. 8); Yorkshire West Riding 19 (Bradford C.B. 10); Durham 15; and Leicestershire 14 (Leicester C.B. 13).

The main centres of acute poliomyelitis were Lancashire 44 (Liverpool C.B. 11, Manchester C.B. 14); London 42 (Hackney 5, Islington 4, Lewisham 4, St. Pancras 4); Warwickshire 39 (Birmingham C.B. 22, Coventry C.B. 5, Sutton Coldfield M.B. 4); Gloucestershire 38 (Bristol C.B. 24, Sodbury R.D. 4); Yorkshire West Riding 38 (Leeds C.B. 8, Bradford C.B. 6, Sheffield C.B. 5); Lincolnshire 32 (East Kesteven R.D. 18); Durham 31 (Hebburn U.D. 5, Boldon U.D. 4, Stockton-on-Tees M.B. 4); Middlesex 24; Staffordshire 21 (Lichfield R.D. 4); Essex 19 (Romford M.B. 4); Kent 9 (Bromley M.B. 4); Leicestershire 18 (Leicester C.B. 15); Northumberland 18 (Newcastle-upon-Tyne C.B. 7); Glamorganshire 15 (Cardiff C.B. 4); Worcestershire 15 (Dudley C.B. 4, Bromsgrove R.D. 4); Sussex 13 (Brighton C.B. 4); Dorset 13; Yorkshire East Riding 11 (Kingston-upon-Hull C.B. 6); Devonshire 10; Yorkshire North Riding 10 (Middlesbrough C.B. 5); and Norfolk 10.

In *Scotland* increases were recorded in the number of notifications of scarlet fever 43, acute poliomyelitis 21, and whooping-cough 18, and decreases were reported for cerebrospinal fever 17, and dysentery 13. A rise in the incidence of scarlet fever occurred in most areas. The chief centres of acute poliomyelitis were Glasgow 20, Dundee 9, Fife county 7, Lanark county 7, Ayr county 6, Aberdeen county 4, and Greenock 4. The largest returns of dysentery were from Glasgow 45, Edinburgh 14, and Dundee 8.

In *Eire* the notifications of measles were 21 fewer than in the preceding week, while the notifications of whooping-cough were 19 above the previous week's total. A fall of 18 in the notifications of scarlet fever occurred in Dublin C.B., while a rise of 11 occurred in the remainder of the country.

In *Northern Ireland* the trends of infectious diseases remained practically constant. The largest returns of acute poliomyelitis were from Down county 8, Antrim county 6, and Belfast C.B. 4.

Week Ending September 2

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 715, whooping-cough 3,671, diphtheria 51, measles 3,413, acute pneumonia 235, acute poliomyelitis 491, dysentery 156, paratyphoid fever 6, and typhoid fever 7.

Medical News

Lecturing in North America

Sir Geoffrey Jefferson, C.B.E., F.R.S., Professor of Neurosurgery at Manchester University, will be making a lecture tour in North America next month. He will be giving the Sommer Memorial Lectures at Portland, Oreg., October 3–5; the Opening Address to the California Academy of Medicine, San Francisco, October 14; the Balfour Lecture, Toronto University, October 18; and the Martin Lecture to the American College of Surgeons, Boston, October 23.

Medical Studentship in Experimental Psychology

The Medical Research Council invites applications from men or women recently qualified in medicine and with one or two years' experience in hospital appointments for a studentship for training in methods of experimental psychology. The studentship will be tenable at the Psychological Laboratory, University of Cambridge, for a period of not less than one year. It will carry a stipend at the rate of £500 per annum (not expected to be liable to income tax); tuition fees and laboratory expenses will be met in addition. The award will be made with a view to future opportunities for research in medical problems of psychology, but no promise of employment after the expiry of the studentship can be given. The selection will be made as soon as possible after October 1, and applications should be lodged before then with the secretary, Medical Research Council, 38, Old Queen Street, London, S.W.1 (Telephone: Whitehall 4884), from whom forms for the purpose can be obtained.

British Epilepsy Association

At a meeting held on September 5 at Mansion House, Portland Place, London, W.1, it was decided to form a society known as the British Epilepsy Association, with the objects of bringing before the public the special needs of epileptics and of promoting their welfare generally. Lady Cynthia Colville was elected chairman, Miss Irene Gairdner honorary secretary, and a provisional council was formed. At a Press conference Lady Colville said that the association, which had the support of the medical profession, would carry out educational and propaganda campaigns to create a proper understanding of epilepsy.

Animal Experiments

The Fight Against Disease, which since 1921 has been the official organ of the Research Defence Society, has been renamed *Conquest*. Since the war only two issues per annum have been published; it is intended to publish *Conquest* quarterly, or even bi-monthly, and to include in it authoritative papers demonstrating important advances in prophylaxis, diagnosis and treatment, the relief of pain, and the prolongation of life which have resulted from experiments on animals. The first number of *Conquest* includes a brief history of the society and a statement of its aims and objects.

Dutch Medical Journals

Acta Brevia Neerlandica, which since 1931 has published Dutch contributions to physiology, pharmacology, and microbiology, is to combine with *Archives Néerlandaises de Physiologie de l'Homme et des Animaux* to form a new quarterly entitled *Acta Physiologica et Pharmacologica Neerlandica*. Papers in the new journal will appear in English, French, or German.

To Visit Greece

Mr. St. J. D. Buxton is visiting Greece for the third time on the invitation of the Greek Recovery Programme Committee from September 17 to October 5 to advise on rehabilitation of the wounded and sick and on the development of a national service for the care of cripples.

Wills

Mr. Thomas A. Hindmarsh, of Newcastle-upon-Tyne, left £59,950; Dr. Edmund R. Boyd, of Blythe Bridge, Staffs, £15,430; Dr. Edward Somerset, of Newbury, Berks, £17,464; Dr. Theodore H. Waller, of Bedford, formerly head surgeon of Chelmsford Hospital, £12,339; and Dr. J. K. Cumming, senior consultant surgeon to the Royal Infirmary, Blackburn, and senior consultant surgeon to the Blackburn District Hospitals Group, £9,207.

COMING EVENTS

Royal Free Hospital School of Medicine

The inaugural address at the opening of the 1950–1 session of the Royal Free Hospital School of Medicine will be delivered by Professor Lillian M. Penson, Vice-Chancellor of the University of London, at B.M.A. House, Tavistock Square, London, W.C., on Friday, September 29, at 3 p.m.

King's College Hospital Medical School

Sir Lionel Whitby, Regius Professor of Physic in the University of Cambridge, will deliver the inaugural address at the opening of the 1950–1 session of King's College Hospital Medical School at the school, Denmark Hill, London, S.E., on Friday, September 29, at 2.30 for 3 p.m.

Contraceptive Technique

A lecture and demonstration (on living models) on contraceptive technique will be given by Dr. Marie C. Stopes at the Mothers' Clinic, 108, Whitfield Street, London, W., on Thursday, October 5, at 2.30 p.m. Tickets must be obtained in advance, as space is limited.

St. Thomas's Hospital Dinner

The St. Thomas's Hospital Old Students' Dinner will be held at Claridge's Hotel, Brook Street, London, W., on Friday, October 20, at 7 for 7.30 p.m., when the chair will be taken by Mr. J. P. Hedley. The price of the dinner, exclusive of drinks, is 30s. Dress, dinner jackets. Tickets may be obtained from the honorary secretaries, St. Thomas's Hospital, S.E.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Wednesday

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, London, W.—September 20, 3 p.m., *"Modern Anaesthesia in France and its Developments Related to Cardiac Surgery,"* Bengué Memorial Award Lecture by Dr. Nadia du Bouchet (Paris).

Thursday

CHADWICK TRUST.—At St. Mary's Hospital Medical School, Norfolk Place, Praed Street, Paddington, London, W., September 21, 4.30 p.m., *"The Public Health Aspects of Venereal Disease Control,"* Malcolm Morris Memorial Lecture by Professor J. Earle Moore, M.D. (Johns Hopkins University).

ROYAL SANITARY INSTITUTE.—At Winter Gardens, Malvern, September 21, 10 a.m., papers: *"Water Supplies—An Unusual Case of Copper Poisoning,"* by Dr. A. J. B. Griffin; *"Malvern Miscellany,"* by Mr. C. C. Judson, B.Sc. Afternoon: visits will be made.

Friday

BIOCHEMICAL SOCIETY.—At Derby Hall, University of Liverpool, N. Mossley Hill Road, Liverpool, 18, September 22, 11 a.m., 289th meeting. Symposium: *"The Biochemistry of Fish."*

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, London, W.—September 22, 8 p.m., general meeting. *"The Treponemal Immobilization Test in Relation to Biologic False Positive Tests for Syphilis,"* by Professor J. Earle Moore, M.D. (Johns Hopkins University). A discussion will follow.

APPOINTMENTS

ANNING, STEPHEN TOWERS, M.D., M.R.C.P., Assistant Dermatologist (Consultant), the General Infirmary at Leeds.

BREMNER, ALAN E., M.B., Ch.B., F.R.C.S.Ed., Associate Orthopaedic Surgeon, Royal Victoria Infirmary, Newcastle-upon-Tyne, and Consultant Orthopaedic Surgeon to Gateshead Group of Hospitals.

COLLINS, MICHAEL JOSEPH, M.B, B.Ch, D.P.H., Medical Officer of Health, Hucknall Urban District, and Assistant County Medical Officer, Nottinghamshire County Council.

COOK, J. B., M.D., M.R.C.P., Senior Registrar, Neurological Department, the General Infirmary at Leeds.

CRAMOND, JAMES, M.B, Ch.B., D.P.H., Deputy Medical Officer of Health, Borough of Barking, Essex.

EUSTACE, ANTHONY, M.B., B.Ch., D.P.H., County Medical Officer of Health, Donegal, Eire.

KORVIN, H. G., F.R.C.S., Orthopaedic Surgeon to Mayesbrook School Clinic and Newbury Hall Clinic, Ilford, Essex.

POWELL, K. J., M.B, B.S., D.A., Consultant Anaesthetist, Exeter Clinical Area.

PRICHARD, JOHN STOBO, *M.C.*, M.B., B.Chir., M.R.C.P., Neurologist, Hospital for Sick Children, Toronto, Canada.

ROBINSON, MARGARET M. F., M.D., D.P.H., Assistant Medical Officer of Health for Maternity and Child Welfare, Derby.

SMITH, GEORGE W., M.R.C.S., L.R.C.P., House-surgeon, St. Helier Hospital, Carshalton, Surrey.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD.—*Consulting Obstetrician and Gynaecologist in North Gloucestershire Clinical Area*, S. A. Bond, M.B., Ch.B., F.R.C.S., M.R.C.O.G.; *Consulting Radiologist in South Somerset Clinical Area*, D. R. F. Bertram, M.B., B.S., D.M.R.

STEPHEN, J. D., M.B., Ch.B., Pathologist, Regina General Hospital, Regina, Saskatchewan, Canada.

TATTERSALL, WILLIAM H., M.D., Consultant Chest Physician to the Bournemouth Area, South-west Metropolitan Regional Hospital Board.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Fergusson.—On August 27, 1950, at 9, Grosvenor Street, Edinburgh, to Elizabeth (formerly Brouton), wife of Dr. R. S. C. Fergusson, a son.

Shield.—On August 21, 1950, at Lyndhurst, Hants, to Margie (formerly Wood), wife of James B. Shield, F.R.C.S.Ed., a daughter—Pamela Joan.

MARRIAGES

Blend—Imerdauer.—On September 5, 1950, in London, David Blend, M.B., B.S., to Martha Imerdauer.

Donaldson—Wilson.—On September 2, 1950, at Jesmond Parish Church, Newcastle-upon-Tyne, Dr. Richard Gordon Donaldson to Dr. Ann Kenya Wilson.

Tompkins—McCoshim.—On August 28, 1950, in Glasgow, Arthur B. Tompkins, M.B., D.C.H., to Sheena E. McCoshim, M.B., Ch.B.

DEATHS

Cochrane.—On May 25, 1950, Stanley Cochrane, L.R.C.P.&S.Ed., L.R.F.P.S. Glas., of Mitcham, Victoria, Australia.

Ferguson.—On September 7, 1950, at a nursing-home, Edinburgh, Peter Joseph Henry Ferguson, M.B., C.M., of 4, Oxford Terrace, Edinburgh, late of 9, Windsor Street, Edinburgh.

Fletcher.—On September 9, 1950, at Burton Corner, Petworth, Sussex, Herbert Morley Fletcher, M.D., LL.D.(Hon.), F.R.C.P., aged 85.

Gillespie.—On August 22, 1950, at 29, Hockerill Street, Bishop's Stortford, Herts, Edward Gillespie, M.B., F.R.C.S., late of Weymouth Street, London, W.

Gunson.—On June 6, 1950, in Australia, Edward Burton Gunson, M.D., F.R.C.P.

Henry.—On July 13, 1950, Claude Dawson Henry, M.D., of Lower Hutt, New Zealand.

Hudson.—On August 26, 1950, at 6, Castleview Road, Rochester, Kent, Osborne Henderson Hudson, M.R.C.S., L.R.C.P., aged 90.

Kirkpatrick.—On August 19, 1950, William Alexander Kirkpatrick, M.B., B.S., of Skelton-in-Cleveland, Saltburn, Yorks, aged 47.

Kirwan.—On August 29, 1950, at a Croydon nursing-home, John Francis Kirwan, M.B., B.Ch., aged 50.

Lyons.—On September 1, 1950, the result of an accident, Harold Michael Lyons, M.R.C.S., L.R.C.P., of Bishop's Corner, The Bishop's Avenue, London, N., late of Didsbury, Manchester.

Milton.—On August 29, 1950, at Passey's House, Eltham, London, S.E., Edward Farminer Milton, M.D., aged 68.

Murison.—On September 8, 1950, at 4, Olden Lane, Purley, Arthur Alexander Murison, L.R.C.P.&S.Ed., L.R.F.P.S.Glas., late of City Chambers, Glasgow.

Palmer.—On September 2, 1950, at Nottingham, Charles James Palmer, L.S.A., J.P., of Longdale Lane, Linby, Notts, formerly of Mansfield Woodhouse, Notts, aged 81.

Pim.—On August 24, 1950, at Holcombe, Bath, William Ferguson Pim, M.D., formerly of Foxrock, Dublin, aged 83.

Pott.—On September 7, 1950, at Upham, Hants, Francis Henry Pott, M.R.C.S., L.R.C.P., of 81, Cornwall Gardens, London, S.W., aged 89.

Rivaz.—On September 3, 1950, Percy Montgomery Rivaz, M.D., Surgeon Captain, R.N., Ret., of 23, Vanbrugh Park, Blackheath, London, S.E.

St. Johnston.—On August 29, at an Eastbourne nursing-home, Sir Thomas Reginald St. Johnston, K.C.M.G., M.R.C.S., L.R.C.P., late Governor of the Leeward Islands.

Tucker.—On September 2, 1950, at St. Helier Hospital, Carshalton, William Marwood Tucker, B.M., B.Ch., of Gisborne, New Zealand, aged 33.

Wight.—On August 26, 1950, at Wangford, Beccles, Suffolk, Cecil Harold Wight, *M.C.*, M.R.C.S., L.R.C.P.

Wolff.—On August 28, 1950, at Bears House, Hingham, Norwich, Ernest Douglas Wolff, M.R.C.S., L.R.C.P.

Woodcock.—On September 5, 1950, at 23, Burton Crescent, Headingley, Leeds, Herbert de Carle Woodcock, M.D., F.R.C.P.Ed., D.P.H., aged 89.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Varicose Vein Injections

Q.—*Can you tell me something of the nature and frequency of unpleasant sequelae resulting from the injection of sclerosing agents into varicose veins—assuming that the technique has been properly carried out? One is struck by the contrast between the great care and forethought we give to antecubital venous injections and the comparative recklessness we show when we are injecting sclerosing agents into the varicose veins of our patients. Ought we not, for example, to test a patient's urine before we subject him to the somewhat hazardous business of "intravenous phenol therapy"? Do soaps injected intravenously become hydrolysed, and, if so, is there not a potential danger of oleic or morrhuic acids so formed giving rise to oil embolism?*

A.—Unpleasant sequelae occur after the injection of varicose veins in a small number of cases, and the ideal sclerosing agent is yet to be found. Prevention of complications is assisted by avoiding injections in cases of previous severe spontaneous thrombophlebitis, ischaemic conditions of the leg, gross secondary skin changes, and in patients who are not ambulant. A very severe local reaction may lead to an injection ulcer and cause sufficient pain to keep the patient still during the following day, thus encouraging the spread of thrombosis to the deep veins. Sudden collapse following the injection and delayed urticaria are severe enough complications to warrant the cautious use of sclerosing agents, particularly sodium morrhuate and monoethanolamine at the first session. Haematuria and pulmonary embolism are very rare complications. The safest substance to use is probably 30% saline, but it is extremely painful when injected in quantities sufficient to produce good thrombosis, and general anaesthesia is usually necessary. Monoethanolamine is used in many clinics, but very rarely an attack of urticaria is encountered with this synthetic soap, which is included in the *British Pharmacopoeia*. Sodium morrhuate has fallen into disrepute following frequent reports of reactions after its use. There is some experimental evidence (*Proc. R. Soc. Med.*, 1948, **41**, 631) that not more than 2 ml. of sclerosing agent should be injected into a varicose vein at a time, owing to possible damage to the valves in the deep veins. With the patient lying down, 2 ml. of radio-opaque solution has been shown to stay in the superficial veins until the leg is exercised, when it is rapidly dispersed in the general circulation and diluted so much that no distant effects are produced.

Sterilization of the Male

Q.—*Would you kindly let me know the immediate, permanent, and any late effects of sterilization of a healthy male aged 30 by vasotomy? Under effects I include those on libido, sexual functions, mentality, physical organs, and any other known changes. Is vasotomy 100% certain, if carefully performed, to prevent any danger of insemination?*

A.—Vasotomy has no ill-effects of any kind, either immediate or remote. Occasionally there is a little temporary swelling and discomfort for 48 hours after the operation, but even this is unusual. Libido is not affected. A few patients notice that the amount of fluid ejaculated is a little less than previously, but this does not spoil their pleasure, which is more likely to be enhanced by the elimination of all anxiety on the score of a possible conception. Atrophy never follows, and there is no increased risk of developing a testicular neoplasm. The operation is sometimes carried out as a rejuvenating measure (Steinach's operation), so it is not likely to precipitate premature old age. If the operation is properly carried out and the possibility of recanalization guarded against it is 100% successful, but contraceptive measures must be continued until the spermatozoa beyond the ligated and divided vasa have been eliminated: half a dozen ejaculations should be sufficient to secure this, but it is safer to examine the semen microscopically and to be certain that it contains no spermatozoa before discarding these measures.

Ankylosing Spondylitis

Q.—*What are the causes of ankylosing spondylitis? On what points does the diagnosis rest and what is the treatment? Is it possible that the condition could result from, or be aggravated by, any of the well-known tropical diseases? Could living conditions in a country such as Iraq have any special bearing on it?*

A.—The cause of ankylosing spondylitis is unknown. It is considered by some to have an infective origin, but no specific infective agent has been proved. Others have suspected an endocrine basis, but again there is little evidence to support the hypothesis. The relationship between ankylosing spondylitis and rheumatoid arthritis is also uncertain.

The diagnosis is made from a consideration of the clinical, radiological, and serological findings. Clinically, the disease begins typically in young (17–30) male adults. There is deep pain first localized across the sacro-iliac area, later spreading upwards towards the lumbar and dorsal spine. At the same time there is increasing stiffness of the spine. In progressive cases the cervical spine and sometimes the hips are involved. In the typical established case the main features found on examination are gross rigidity of the spine (often excepting the upper cervical region) and markedly diminished chest expansion on respiration (often as little as half an inch). Radiologically the first changes (always bilateral) are seen in the sacro-iliac joints. There is loss of the sharp outline of the joint margins, which have a fuzzy appearance. Later, bony ankylosis of the joints occurs. As the disease progresses changes of a similar nature are seen in the lumbar, dorsal, and often in the cervical spine. There is destruction and obliteration of the facet joints and bridging of the vertebral bodies by ossification of the longitudinal ligaments. In cases with hip involvement there is progressive narrowing and, later, bony ankylosis of one or both joints. It is important to note that the stiffness of the spine, as observed clinically, is in advance of the radiological changes: thus a large part of the spine may be almost completely rigid when the radiological changes are confined to the sacro-iliac joints. The blood sedimentation rate is much raised during the active stage of the disease.

Treatment may be considered under four headings: relief of symptoms and arrest of the disease; prevention of deformity; maintenance of maximum function; and reconstructive or corrective operations in the late stage. Deep *x*-ray therapy is the most effective method of relieving the symptoms, and it is thought that it often leads to arrest or delays the progress of the disease. The marked tendency to flexion deformity of the spine is prevented mainly by sleeping on a hard flat mattress in the supine position, with not more than one pillow. Flexion deformity is almost inevitable if the patient sleeps on his side with spine, hips, and knees flexed. Occasionally, in the active stage, a plaster bed is advisable. Maintenance of maximum function depends upon adequate supervision by a physiotherapist to ensure that all movable joints are used to the full extent and that the muscles controlling them retain their full power. Special exercises for this purpose are advisable. In the later stages, if marked crippling or deformity has occurred, certain reconstructive operations may be advisable. The most useful are arthroplasty of the hip (for pain or ankylosis) and corrective osteotomy of the spine (for fixed flexion deformity).

Since the cause of ankylosing spondylitis is unknown it is difficult to say with certainty whether its incidence or course is likely to be influenced by living conditions or disease in other countries. Though some observers gained the impression during the war that ankylosing spondylitis did seem to occur unusually frequently in troops stationed overseas, the writer knows of no statistical evidence to support the impression.

Vaccination Failing to Take

Q.—*I should be glad of your advice concerning a child, now aged 2, who has been five times vaccinated, with negative results, by three different doctors. On the last occasion special lymph was obtained in view of the four previous failures. Bearing in mind the letter by Colonel W. Strelley Martin in the "Journal" of May 13 (p. 1142), can you suggest any further measures? Is intradermal injection of lymph ever employed in resistant cases? The child's father has lived in the East and has a friend with a similar history of unsuccessful vaccination in infancy; he subsequently developed severe smallpox.*

A.—It is most unusual to find a young child completely refractory to primary vaccination. It is not stated at what age the unsuccessful attempts were made in this case, but if they were done in the first few months of life it is possible that the infant still had enough antibody by passive transfer from the mother to interfere with a successful vaccination, particularly if the mother had been vaccinated within a year or two of the child's birth. A further attempt at vaccination should be made now with vaccine lymph used as soon as possible after it is received, since vaccine quickly loses potency if not kept in the refrigerator. Intradermal injection is not likely to be more effective than inoculation by scarification or multiple pressure. The suggestion that the British vaccine lymph used in the Middle East during the late war was ineffective was thoroughly investigated and refuted by an expert committee.

Lichen Planus

Q.—*What is the modern treatment for lichen planus? A male patient aged 55 has had this condition for two years. He has a rash on the glans and the body of the penis, with mucous patches in the mouth. He has been treated with various salicylate creams and bismuth injections weekly. Arsenic causes a severe skin irritation.*

A.—No specific cause for lichen planus has been demonstrated, though a great deal of work has been done on the influence of constitutional and psychological disturbances and on the part played by drugs in precipitating this disorder. These factors are probably of major importance and should receive due attention and treatment. There is no specific remedy, and none of the modern drugs has shown any particular merit in treatment. Rest and holidays are important; the old-fashioned treatment with mercury as liquor hydrarg. perchlor. dr. 1 (3.5 ml.) t.d.s., or by weekly injections of mercuric salicyl arsonate gr. ¼ to gr. 1 (32–65 mg.) intramuscularly to a total of gr. 6, may help in some cases. In this particular patient arsenic appears to be contra-indicated. *X*-ray therapy directed over the enlargements of the spinal cord, as suggested by Pautrier or as modified by Hellier (*Brit. J. Derm. Syph.*, 1943, **55**, 11), is sometimes effective. Painting with thorium X has been advocated by some authorities, as has the administration of calciferol in large doses, but none of these remedies is significantly successful. Rest and attention to psychological factors seem to be of much more importance.

Rectal Thiopentone

Q.—*I see in the "Journal" of July 1 (p. 21) an article on rectal thiopentone for minor surgery. Would this be a safe method of giving an anaesthetic for minor surgery in one's consulting-room—for circumcisions, for example—if one has a colleague available to control the anaesthetic and apparatus for administering oxygen in an emergency?*

A.—With the dose usually advised—e.g., 1 g. per 50 lb. (22.5 kg.) body weight—rectal thiopentone cannot be relied upon to produce anaesthesia of sufficient depth and duration for an operation like circumcision. Lorber (*British Medical Journal*, July 1, 1950, p. 21) pointed out that the child might even react to a stimulus like lumbar puncture and that local anaesthesia would be necessary if any incision of the skin was to be made. He also mentioned that the child is only relaxed in the absence of painful stimuli. Rectal thiopentone is an excellent method of inducing sleep in children prior to general anaesthesia. The rather prolonged recovery time, which may last for one to three hours, probably precludes the use of this method, even as sedative, in a consulting-room, unless there are facilities for watching the child throughout the recovery period. A more satisfactory technique for anaesthesia for circumcision in these circumstances would be a small dose of pentobarbital sodium given well ahead of the operation, followed by ethyl chloride and open drop ether as the main anaesthetic.

Trichlorethylene for Dental Operations

Q.—*Is trichlorethylene useful for anaesthesia for dental extractions? If so, how should it be administered? Are there any special intranasal techniques?*

A.—Trichlorethylene is a very useful supplement when dealing in the dental chair with robust patients who are difficult to anaesthetize with nitrous oxide alone. Any simple vaporizer, such as Marrett's bottle, Rowbotham's chloroform bottle, or any ether bottle, is plugged into the apparatus between the nitrous oxide cylinders and the patient. The merest trace of trichlorethylene will smooth out an otherwise difficult anaesthetic. If more than this trace is used the patient may feel "heavy" for some little time after the extraction. No alteration in the usual methods of nasal administration of gas and oxygen is necessary when trichlorethylene is added as a supplement. Trichlorethylene provides excellent general analgesia for cavity preparations, and details of two methods will be found in *Recent Advances in Anaesthesia* (L. Hewer, 6th ed., London, 1949, p. 259).

Antihistaminic Drugs and Diabetes

Q.—*A diabetic patient on large doses of insulin is sensitive to bee-stings, which provoke an alarming reaction. Is there any contraindication to the administration of antihistaminic drugs in such a case?*

A.—"Benadryl" would probably cause a small increase in the insulin requirements, but this would be very small in comparison with the increase in insulin requirements which occurs as a result of severe reaction due to bee-stings. It is certainly worth while trying whether the benadryl or other antihistaminic drug will prevent local reaction, since the diabetic condition would then be much less upset.

Duodenal Ulcer, Obesity, and Hypertension

Q.—*Would you suggest a suitable reducing diet for an obese hypertensive patient who is suffering from an active duodenal ulcer? He has had one bout of bleeding about a year ago.*

A.—It is difficult to devise a diet for the synchronous treatment of peptic ulceration and obesity. It is not clear from the question whether the patient is at present in bed undergoing intensive medical treatment for the former; if so, the obesity should be disregarded and every effort made to induce the ulcer to heal. For this purpose the usual regime of multiple meals should be prescribed, but the quantities reduced to lower the daily intake of calories to 1,200. Aluminium hydroxide should be given after each meal and at night; olive oil and other fats should be avoided. If the ulcer heals satisfactorily an ordinary reducing diet should be taken with plenty of aluminium hydroxide to control gastric activity. It is obviously ill-advised to try to reduce the patient's weight and to heal his duodenal ulcer at the same time.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.
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